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NUTRITION DURING PREGNANCY: A REVIEW—*Bertha S. Burke, M.A.* 735
STUDY OF THE NUTRITIONAL QUALITY OF DIETARIES BY CHEMICAL ANALYSIS—*Ernest E. Lockhart, Ph.D., Robert S. Harris, Ph.D., Elizabeth W. Tapia, B.A., Helen S. Lockhart, B.S., Mary K. Nutter, B.S., Virginia Tiffany, B.S., and Albert H. Nagel, S.B.* 742
BLOOD REGENERATION IN WOMEN BLOOD DONORS: I. EFFECT OF GENEROUS AMOUNTS OF MEAT AND MILK IN THE DIET—*Ruth M. Leverton, Ph.D., Thelma J. McMillan, M.S., and Matilda Peters, M.A.* 747
THE NUTRITIVE VALUE OF CANNED FOODS: VI. EFFECT OF LARGE-SCALE PREPARATION FOR SERVING ON THE ASCORBIC ACID, THIAMIN, AND RIBOFLAVIN CONTENT OF COMMERCIALLY-CANNED VEGETABLES—*Winifred F. Hinman, Ph.D., Miriam K. Brush, M.S., and Evelyn G. Halliday, Ph.D.* 752
ASCORBIC ACID, THIAMIN, AND RIBOFLAVIN RETENTION IN FRESH SPINACH IN INSTITUTION FOOD SERVICE—*Kathleen L. Cutlar, M.S., Josephine Brown Jones, Ph.D., Katharine W. Harris, M.A., and Faith Fenton, Ph.D.* 757
VITAMIN K CONTENT OF THE CALIFORNIA AVOCADO—*S. Lassen, Ph.D., K. Bacon, B.A., and J. Sutherland, B.A.* 761
THE PROBLEM OF RELIEF IN LIBERATED COUNTRIES—*Roy F. Hendrickson* .. 763
EDITORIAL
The Chicago Meeting 766
Lucy H. Gillett Retires 766
NUTRITION AND THE WAR
A Hospital Mess Department in Italy—*Lt. Pauline H. Emerson, M.D.D., A.U.S.* 767
The Training Course for Dietitians at Fitzsimons General Hospital—*Capt. Mildred Allbritton, M.D.D., A.U.S.* 769
Appointments and Promotions, Army Medical Department Dietitians .. 770
BOOK REVIEWS 771
CURRENT LITERATURE 772
NEWS NOTES 777
INDEX TO VOLUME 20 781

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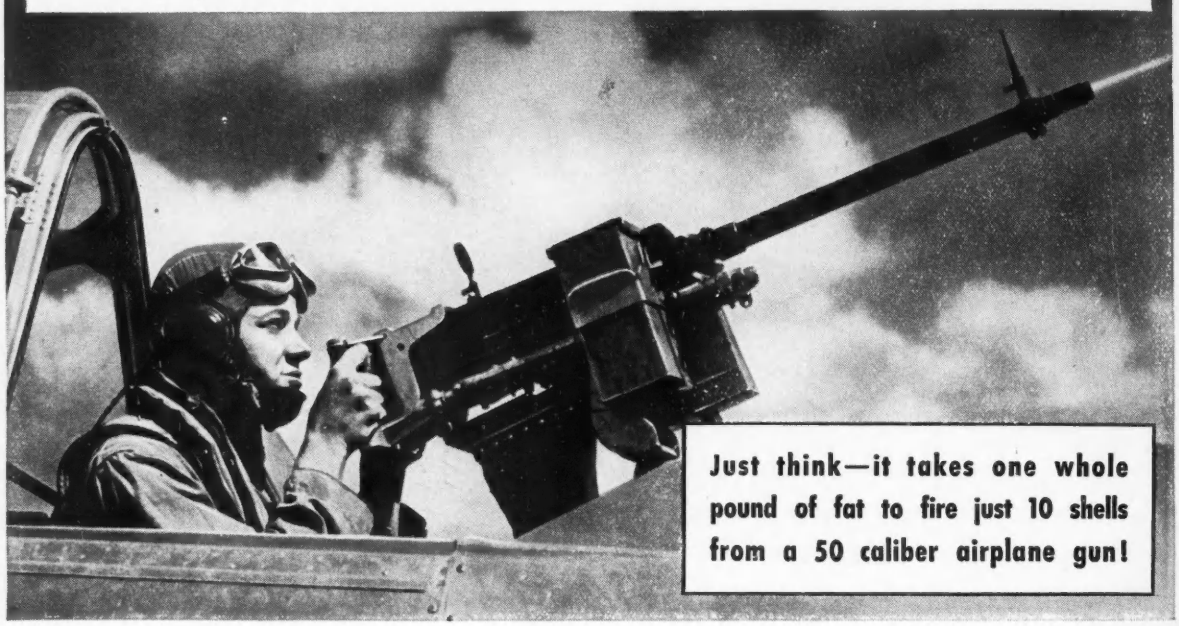

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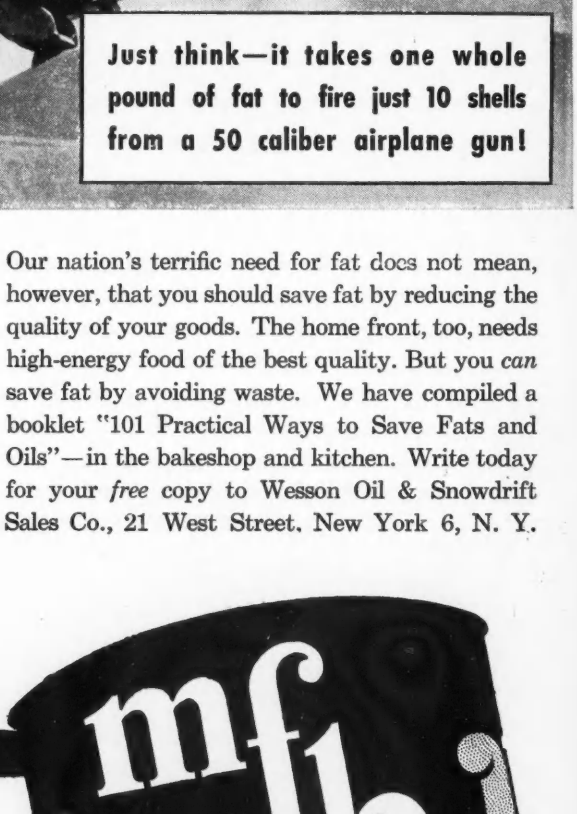

NUTRITION DURING PREGNANCY: A REVIEW[1]

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THE nutritional requirements of women are considerably increased during pregnancy and they or their offspring may suffer serious consequences if the diet during pregnancy is inadequate. These groups will be among the first to show ill effects from food shortages, unless special provisions are made for them. Hence, the nutrition of pregnant women should receive priority consideration in wartime and in any plans for postwar rehabilitation. It seems timely, therefore, to review the advances made in our understanding of the nutritional requirements of the pregnant woman and the benefits which may be expected to accrue to both mother and infant through proper nutrition during pregnancy.

EXPERIMENTS ON ANIMALS

In the records of animal experimentation, illustrations of fetal damage resulting from prenatal dietary deficiency of various types are frequent. An early classical example is the work of the University of Wisconsin Agricultural Experiment Station (1) describing the effects of different rations derived respectively from corn plant, wheat plant, and oat plant, and a mixture of these upon heifers during growth and reproduction. The corn-fed heifers were the healthiest, sleekest animals of the lot, and gave birth to full-term vigorous young, normal in size, and able to stand and suck within an hour after birth. All of the young lived and developed normally, whereas the young of the wheat-fed mothers, whose coats were rough, were born prematurely, were small, and either were stillborn or died within a few hours. The mothers who were fed the oat plant or a mixture of the three grains were superior in appearance to the wheat-fed group but inferior to the corn-fed group, and their young were either weak or stillborn. The mothers were continued on the experimental rations and the following year repeated in all essential details their previous reproduction records. Later work (2) showed that the wheat plant ration could be made satisfactory by the addition of bone meal and cod liver oil. Sherman (3), in explaining the better results obtained with the corn plant, suggested that it furnished a ration more satisfactory for reproduction in one or more of the following factors: calcium, phosphorus, vitamin A, riboflavin, certain of the essential amino acids, and possibly vitamin D. Another early study is the work on fetal athyrosis (4, 5), the hairless pig malady, which was shown to be due to a low iodine intake or assimilation. It is of interest that the resulting deficiency, usually causing the death of the fetus, interfered more with fetal development than with the health of the mother. Hale (6) has shown the relation of vitamin A deficiency to microphthalmia in pigs. These animals showed such other abnormalities as cleft palate, harelip, misplaced kidneys, and subcutaneous cysts. Hale concluded: "That maternal vitamin A deficiency results in congenital blindness seems very likely in the light of these experiments, but how and when the anomaly is formed are largely questions for the future. These experiments, however, do present a new field of thought and place diet during the early stages of embryonic development in a very important position."

The recent work of Warkany and his associates (7, 8) has contributed greatly to our understanding of the part which maternal dietary deficiency plays in congenital malformations in the rat. Warkany's most recent publication (9) shows with startling clarity that the dietary factor lacking in his "diet I," present in large amounts in pig liver and already proved by him to be necessary for the normal prenatal development of the rat, is riboflavin. On a purified maternal diet, in which the vitamin B complex was supplied by pure crystalline substances, malformations of the pattern of "diet I," such as shortening of the tibia, mandible, fibula, radius, and ulna, fusion of ribs, fingers and toes, and cleft palate, appeared in the offspring when riboflavin was omitted. Of a total of 137 offspring, 33 were abnormal. When this maternal diet was supplemented with riboflavin in adequate amounts, the rats gave birth to 120 anatomically normal young and no abnormal young. Warkany states: "An inquiry into a maternal nutritional deficiency which manifests itself in the offspring differs from other investigations concerned with the finding of a vitamin or vitamin-like factor. The stores of the maternal tissues act as 'buffers' which prevent deprivation of the developing embryo as long as possible. In fact, it was assumed until recently that these maternal stores either protect the offspring completely, thus resulting in the delivery of normal young, or that in case of extreme dietary deficiency the embryos die *in utero*. Although there is some truth in this 'all or none' theory, it is not entirely correct. Between the two extremes there exists a narrow range in which maternal nutritional deficiency may result in arrest of the embryo's development without causing death. In this case congenitally deformed offspring may be the result."

EFFECTS OF GENERAL DIETARY DEFICIENCY IN HUMAN PREGNANCY

Evidences of damage to the human fetus from prenatal dietary deficiencies of various types are found in the literature. The work of Maxwell and his co-workers (10) has demonstrated that fetal rickets may result from prenatal nutritional deficiency. He presents in detail 16 cases of fetal rickets. Dunham (11) and Rector (12) have also shown that fetal rickets or rickets in the early weeks of life may result from lack of calcium, phosphorus, or vitamin D in the prenatal period. Maxwell (13) also cites a case of keratomalacia of both eyes at birth in an infant of a Chinese woman who had been on a diet markedly deficient in vitamin A. To reread a few of these older papers in view of our present knowledge of nutrition is most enlightening.

Toverud (14) has reported that x-rays of newborn infants show great variations in the calcification of the teeth. He states that this calcification is determined not only by the age of the fetus, but also by the nutritional and general physical condition of the mother.

In the *Indian Medical Gazette* (15) and the *Indian Journal of Medical Research* (16, 17) a severe type of anemia is described in which the maternal mortality was approximately 53 per cent; in addition, there was considerable infant mortality. Wills showed that this anemia was due to a deficient prenatal diet and that it was curable by the use of yeast extract. She further produced and cured the disease in monkeys by withholding protein and yeast and then feeding these. She also successfully treated a series of hospital patients. Her final conclusion was that this condition in the pregnant woman with the resulting high infant mortality was a simple dietary deficiency preventable by the consumption of protein of high biological value, especially meat, and, if working with a vegetarian population, the use of a yeast product. With our present knowledge of nutrition, it seems evident that these women were suffering mainly from a deficiency of the B complex and possibly protein.

[1] Received for publication September 20, 1944.

The balance studies of Macy and her co-workers (18) and of Coons (19) dealing with the metabolism of women during the reproductive cycle have added much factual data on the nutritional requirements in this period. Adair and his co-workers (20) state that the results of their recent metabolic studies of calcium, phosphorus, nitrogen, and iron made on 14 women at intervals during pregnancy were essentially similar to those reported many years previously by Macy and Coons. Oberst and Plass (21) have studied the calcium, phosphorus, and nitrogen metabolism of women during the second half of pregnancy; their paper contains a valuable summary table of such studies in the literature.

Several recent prenatal studies on large numbers of women, which have included evaluation of their diets, have indicated the importance of nutrition during pregnancy to both mother and fetus. The first report of this type to arouse considerable interest was the Toronto study of Ebbs *et al.* (22, 23, 24). One group of 120 women on poor diets and with low incomes were studied during the last half of pregnancy as controls for 90 women on equally poor diets and with low incomes who were supplied with milk, eggs, cheese, oranges, tomatoes, wheat germ, and vitamin D capsules, and 170 women with fairly adequate incomes who were instructed in the type of diet considered necessary for pregnancy. The incidence of miscarriages, premature births, stillbirths, and deaths before 6 months of age was significantly higher in the poor diet group. The women on the supplemented or good diets enjoyed better health, had fewer complications, and proved to be better obstetrical risks than those on the poor diets. These workers also state that, in a large proportion of the cases, one could identify the diet group of the mother by the appearance of her baby at 6 months of age. The increased incidence of minor and major diseases in the babies born of mothers in the poor diet group was apparently quite marked.

Williams (25) studied the nutrition of 514 women in relation to the course of pregnancy, the puerperium, and the condition of the infant at birth and found no relationships between the diet during pregnancy and the complications of pregnancy (except that "84 per cent of a group who presented a history of nausea and vomiting in early pregnancy had intakes below the pregnancy standard of 600 units of vitamin B_1"). He also found no relationships with the puerperium or incidence of stillbirths, prematurity, or neonatal deaths. It is my impression that the statistical handling of these data in many instances precluded significant findings. Apparently a nutrition intake for only one 7-day period was used as representative of the diet during pregnancy, and these intakes were not all at a comparable period of gestation.

The People's League of Health of England (26) investigated the effect of the nutrition of 5022 expectant mothers on maternal and infant morbidity and mortality. Fifty per cent of the women studied were given supplementary minerals and vitamins. The report of the study indicates that the supplementary feeding reduced the incidence of toxemia approximately 30 per cent and states that a similar reduction for the country at large would result in 10,000 fewer cases of toxemia in a year. The reduction in the number of premature births in the supplemented group was statistically significant. There was a trend toward higher birth weights in the group fed the concentrates. The study showed no significant correlation with length of labor or complications of the postpartum period.

Burke *et al.* (27, 28) have reported a study on 216 women to determine the influence of diet during pregnancy upon fetal growth and development as well as upon the course of pregnancy, labor, delivery, and the puerperium. Detailed nutrition histories were obtained at regular intervals during pregnancy, supplemented by food records which the women kept. The diets were evaluated in relation to a set of nutritional standards which approximate values later recommended by the Food and Nutrition Board of the National Research Council. A statistically significant relationship was found between the diet of the mother during pregnancy and the condition of her infant at birth. In the 216 cases studied every stillborn infant, every infant who died within a few days of birth except one, the majority of infants with marked congenital defects, all premature and all "functionally immature" infants were born to mothers whose diets were very inadequate. A statistically significant relationship was also found to exist between the prenatal diet and the course of pregnancy; this relationship, however, was not so marked as that existing between the prenatal dietary rating and the condition of the infant at birth. No woman whose diet was rated good or excellent had toxemia, while among those whose diets were considered poor to very poor there was a 44 per cent incidence, and an 8 per cent incidence in the group whose diets were rated between these two extremes. No statistically significant relationship was found between the prenatal diet and the duration of labor. However, it is of interest that there were many more difficult types of delivery in the poor to very poor diet group despite the fact that these infants averaged almost 3 lb. lighter in weight at birth than the infants of mothers whose diets were good or excellent. No significant relationship was found between prenatal nutrition and the puerperium.

Balfour (29) reports a recent study in England and Wales in which 11,618 pregnant women chosen from the lowest income groups were fed a supplement of marmite or other yeast extract sufficient to furnish 240 I.U. thiamin daily or a proprietary preparation which furnished a rich supply of vitamins A and D, as well as calcium, phosphorus, and iron; 8095 pregnant women from the same areas served as controls. Both groups received additional milk so that the chief differences in diet between the two groups were in the concentrates fed. Any differences in parity, age, social and economic condition were in favor of the control group, and it can be fairly assumed that any favorable results in the fed group were due to the food supplements. The supplementary feeding of marmite or a similar yeast extract resulted in a statistically significant reduction in the number of stillbirths and in the neonatal mortality rate. While there was also a reduction in these mortality rates in the group fed the supplement rich in vitamins A and D and minerals, this was not significant. With either supplement there was also a slight but not statistically significant reduction in the incidence of toxemia and in the maternal mortality rate. Balfour states that, owing to the large number of cases studied and deaths observed, the differences in the stillbirth rates and neonatal mortalities in the supplemented group are significant beyond any reasonable doubt. The maternal deaths were few in spite of the large number of cases.

Dieckmann *et al.* (30) studied a group of 553 pregnant women to determine if additions of calcium, phosphorus, iron, or vitamins A and D to the diet had any beneficial effects on the course of pregnancy or ensured a higher incidence of normal infants. They concluded that "a study of the effect of the additions to the diet on the various complications of pregnancy showed some differences, but no definite conclusions could be drawn. The duration of labor was not shortened by the administration of vitamin D as has been suggested. The additions to the diet caused a significant increase in maternal weight. No significant effects were noted on the fetus that could be attributed to

changes in diet." A careful reading of the paper leaves the impression that the nutrition data included are inadequate to allow satisfactory comparison of the diets of the control group with the basic diets of the other three groups. In criticizing their own work and that of several others in this field, these authors state that "no one has had a large enough number of patients to make any changes which occurred significant." The work of Ebbs *et al.* (22), the Interim Report of the People's League of Health (26), the reports of Burke *et al.* (27, 28), and that of Balfour (29), all present statistically significant differences between good and poor diet groups and collectively would seem to prove beyond any reasonable doubt that adequate nutrition during pregnancy is an important factor in reducing the incidence of stillbirths, prematurity, and neonatal deaths.

EFFECTS OF DEFICIENCIES OF SPECIFIC NUTRIENTS

While space will not permit a detailed consideration of the specific nutrients, a brief discussion of some of the recent papers is included. For a discussion of earlier work the reader is referred to the comprehensive review of Garry and Stiven (31), and to certain general references (32–36).

Caloric Intake. The relationships between weight gain and caloric intake of the mother during pregnancy and birth weight of the infant have been subjects of controversy. Up to the present it has been generally accepted that the weight of the newborn infant is not materially affected by the diet of the mother during pregnancy, unless the diet is extremely deficient, or possibly excessive in calories. An average weight gain of 24.3 lb. was found in a study of 299 cases by Robinson (37), who states that this figure is in general agreement with reports of other American workers with the exception of Stander and Pastore who found an average gain of 30.7 lb. from the sixth week of gestation. Kerr (38) reports an average gain of 22.9 lb. in a case study of 500 normal primiparas and concludes that a tendency to increasing weight gains in pregnancy is associated with infants of heavier weight, but that the increase in infant weight (associated with increased weight gain in the mother) appears to have no influence upon the duration of labor. Kerr also reviews the literature on the effect of diet on birth weight of the infant and length of labor. Burke and co-workers (39) have found an average weight gain during pregnancy of 24.6 lb. for the series of women studied. The underweight woman who gained approximately the same or more than the normal or overweight woman during pregnancy gained more weight herself in relation to preconceptional weight and gave birth to a smaller infant; the very overweight woman consuming inadequate calories lost weight herself but had a larger baby than the normal or underweight woman with adequate calories.

Protein. Arnell *et al.* (40) have emphasized the importance of a diet well supplied with protein during pregnancy. In a group of 225 women in the New Orleans area they found "dangerously low intakes of protein" in 30 per cent of the Negro, 20 per cent of the white charity, and 10 per cent of the private patients. Only 3 per cent of the Negro, 2 per cent of the white, and 12 per cent of the private patients consumed daily an optimal amount of protein (85 gm.) as recommended by the National Research Council for pregnancy. These authors discuss the subclinical and clinical effects of protein insufficiency. Their results show a lower average hemoglobin and serum protein, a higher incidence of preeclampsia, a strikingly higher incidence of edema, increased maternal morbidity, and increased fetal mortality among cases on diets poor in protein, but they point out that, although these trends were found, no definite conclusions can be drawn without further investigation. A study of this paper shows also the apparent difficulty of proving conclusively in human studies that a given nutrient is responsible for a given effect. In our own study (27) we found a statistically significant relationship between the incidence of preeclampsia and general prenatal dietary rating, but no significant relationship with protein alone. When protein was low in the diet, many other dietary factors were also low. We (41) also found in a group of 216 pregnant women that only 10 per cent consumed diets which met the standard for protein recommended by the National Research Council; 68 per cent of the diets contained less than 70 gm. protein daily and 38 per cent less than 55 gm., while 14 per cent contained under 45 gm. protein daily during this important period of rapid fetal development. A very significant relationship was found between the protein content of the mother's diet during pregnancy and the length of her infant at birth. For practical purposes this study indicates that less than 75 gm. protein daily during the latter part of pregnancy results in an infant who will tend to be short, light in weight, and most likely to receive a low pediatric rating in other respects. Here again in a human study it is impossible to prove that protein alone is the significant nutrient—it may well be that certain of the B vitamins, for example, associated in the foods with protein, are factors in this relationship.

Calcium and Phosphorus. It is an accepted fact that the intake of calcium and phosphorus should be increased markedly during pregnancy if the maternal organism's own stores are to be maintained, as well as the fetal needs met. Mention has already been made of the recent work of Dieckmann and his co-workers in regard to calcium, phosphorus, and vitamin D during pregnancy. Boelter and Greenberg (42) report that rats maintained from the time of weaning on a diet severely deficient in calcium failed to mate and that when animals which had borne at least one normal litter were transferred to a low calcium ration they showed a marked decrease in fertility and a lowering of the number of viable young. The mothers, even though they were deprived of calcium after growth was completed, if maintained on the calcium-deficient ration long enough, showed evidences of extreme calcium deficiency but the time of onset was delayed and the severity of the symptoms decreased. Pregnancy was not a great drain upon the calcium stores of the mother rat, although lactation reduced considerably the amount of skeletal calcium. The calcium-deficient young which were able to survive were almost normal at birth except for a low bone ash and bone calcium content. The deficient mother was not capable of providing enough milk to allow for the normal growth of her young. These authors state that "the maternal organism attempted to produce normal young in so far as that was possible and still maintain its own essential calcium supply."

Liu *et al.* (43) studied the calcium, phosphorus, and nitrogen metabolism of Chinese women with osteomalacia during pregnancy. As would be expected from our present knowledge of calcium retention, osteomalacic patients tended to retain more calcium and phosphorus in an attempt to replenish the depleted maternal store as well as to provide for fetal growth. In an attempt to find the actual level of calcium that may be considered adequate for pregnancy, these workers found that in the presence of an adequate supply of vitamin D the same degree of calcium retention was maintained on a somewhat lower intake of calcium, but that in severe vitamin D depletion a high level of calcium would not maintain the individual in balance. The conclusion was drawn that vitamin D is a more important factor than the actual level of calcium intake in determining the extent of retention, provided a reasonable amount of calcium is present in the diet. There seemed to

be a greater mineral conservation in these Chinese women than in normal pregnant women. It was suggested that when dietary habits accustom the subject to a lower intake the added requirement for reproductive activity will be correspondingly lower. The calcium requirement may well be conditioned by such factors as a previous skeletal store, dietary custom, and state of vitamin D nutrition.

In any discussion of the calcium and phosphorus requirements of pregnancy, consideration of the effect on the teeth of an inadequate intake of calcium and related nutrients is pertinent. Berk (44), in a report of the case histories of 198 five-year-old children at the Forsyth Dental Infirmary, showed that one of the factors significant in determining the difference in caries incidence in the two extreme groups (those children having 5 or less teeth affected with caries and those with 15 or more teeth affected) was the mother's milk intake during gestation. Unpublished data of Burke *et al.* (39) on 123 cases show a very significant relationship between the calcium intake of the mother during the latter part of pregnancy and the incidence of caries in the deciduous teeth of the child. Massler *et al.* (45), in a study of the calcification pattern of the teeth, found that until birth or the neonatal period calcification appears to be homogeneous and dense, while from the end of the neonatal period to 10 months of age it is not homogeneous and is easily affected even by subclinical disturbances. The decrease in quality of the postnatal calcification becomes increasingly marked until 10 months of age. They state that the enamel and dentin formed during the first 3 months of life show relatively better calcification than that formed during the subsequent 6 months and suggest that the fetal mineral reserves have not been exhausted in the earlier months. It may well be that a prenatal diet which allows for a liberal storage of calcium and phosphorus in the infant's body at birth is essential to the proper calcification of the teeth during the first 10 months of life.

Iron. Nutritional anemia in pregnancy is still too common, as attested by a review of recent literature. The National Research Council recommends a daily intake of 18 mg. iron in the diet during pregnancy. This figure assumes normal stores of iron and a normal hemoglobin level, while the average woman today too frequently enters pregnancy with depleted iron stores and a resultant low hemoglobin. Bethell (46) reported a 25.4 per cent incidence of anemia in a group of 484 pregnant women studied in a rural area of Michigan. Relationships were found between hypochromic anemia and a deficiency of dietary iron and between macrocytic anemia and an inadequate intake of protein.

The English literature contains several recent papers on hypochromic anemia of pregnancy. Davidson *et al.* (47) found an incidence of anemia (hemoglobin level below 70 per cent) in 24 per cent of 570 pregnant women studied in Edinburgh in 1942. These women showed slightly lower hemoglobin levels than a similar group studied in Aberdeen in 1935. Hamilton and Wright (48), as a result of a study of 392 women during the last two trimesters of pregnancy, conclude that iron preparations should be given routinely during pregnancy and that prenatal clinics should teach the pregnant woman to select and prepare iron-rich diets. In a discussion on nutritional anemia in which Mackay *et al.* (49) participated, the fact was deplored that there are no generally accepted standards with regard to the limits of normal hemoglobin levels for either adults or children, despite the intensive work on anemia in the past 10 to 15 years. They state that it is generally accepted that hemoglobin level is affected by economic status and diet and refer to the work of McCance *et al.* (50) who found a steady fall in the hemoglobin levels of pregnant women, grouped by income level, from an average of 90 per cent for those in the highest to an average of 76 per cent in the lowest income group. The first group had an average daily intake of 15 mg. iron and 55 gm. animal protein; the lowest income group 9 mg. iron and 28 gm. animal protein.

The medical literature from India contains many references to anemia during pregnancy; macrocytic hyperchromic anemia is relatively common during pregnancy and is an important cause of the high infant and maternal mortality in that country. An interesting discussion of this subject is found in a study on 529 pregnant women (51). In an investigation of the important etiological factors in the development of severe anemia in pregnant women in Calcutta, considerable evidence of iron deficiency was found in the whole series of cases. Since the hookworm rate was negligible among those examined, the authors conclude that the cause of the iron deficiency was dietary. This iron deficiency, although widespread, was considered of secondary importance since the majority of cases, including the worst, were macrocytic in type. It is suggested that this anemia is also of nutritional origin because of its higher incidence in the lower economic classes and because in the richer classes macrocytic anemia is correlated positively with vegetarianism and its accompanying lower protein intake. Russell (52) reports 100 cases of macrocytic anemia in pregnant women on the Gold Coast. Here also the maternal mortality was high in the untreated cases, and there was a tendency in both treated and untreated cases toward premature stillbirth or death of the infant in the early neonatal period. The important factors in the etiology were thought to be temporary failure in the production or assimilation of the intrinsic factor, lack of the extrinsic factor or of riboflavin in the diet and/or a preexisting hypochromic anemia.

In a brief review of the anemias of pregnancy, Dillon (53) concluded that in the United States hypochromic anemia during pregnancy is not uncommon and, although seldom dangerous, is nevertheless responsible for minor ailments and ill health in both mother and child and can be readily cured by iron therapy and a generous diet. He also urges determination of the hemoglobin level and red cell count as a routine essential of prenatal care.

Iodine. The only other mineral which may need especial consideration is iodine, since in regions where goitre is endemic the strain of pregnancy may result in deficiency symptoms in either mother or infant or both.

Vitamins. Pregnancy also increases the need for all the vitamins, but in this respect our knowledge is quite limited and much further investigation is needed before the requirements for the various vitamins can be stated with any degree of exactitude. However, the National Research Council (54) figures represent the recommended allowances and, if in the minds of some they seem too liberal, it is well to remember that in the absence of precise information it would be better to err on the side of liberality, since no harm will be done by consuming a moderate excess and considerable harm may result from lack of a specific nutrient essential for structural or regulatory purposes.

Lund and Kimble (55) concluded that plasma vitamin A values during pregnancy reflect in general the dietary intake of the vitamin. They found that as pregnancy progressed the plasma vitamin A value decreased, but the appearance of the decrease was delayed according to the adequacy of the diet. They suggest that storage of the vitamin, plus increased demands of pregnancy, probably accounts for the observed decrease in blood values, and recommend the addition of increasing supplements of vitamin A to an adequate diet during the second and third

trimesters of pregnancy. Lund and Kimble (56) also reported that plasma vitamin A values in the newborn infant were independent of the maternal plasma values, regardless of the mother's intake, but that fetal plasma carotene varied regularly with maternal plasma carotene. These observations suggest that vitamin A, as such, is poorly transmitted from mother to fetus. Byrn and Eastman (57) reported, in a study of 247 pregnant women, no significant lowering of plasma vitamin A at term, although the level was somewhat below that observed in a similar group of nonpregnant women. These workers state that the lower figures for pregnant women may be due to increased nutritional requirement of pregnancy or may be a result of blood dilution. As in the study of Lund and Kimble, postpartum values promptly showed a tendency to return to average nonpregnant levels. Byrn and Eastman found substantial amounts of vitamin A and traces of carotene in fetal plasma, but they state that the problem of placental transfer of vitamin A is not clear. Bodansky *et al.* (58), in plasma vitamin A and carotene studies on 120 pregnant women, found that the mean value of the plasma vitamin A concentration in 70 women in the first two trimesters of pregnancy was significantly higher than the mean value in 62 cases in the third trimester. However, the mean value of the plasma carotene rose significantly during the sixth, seventh, and eighth months of pregnancy. They attribute the decrease in plasma vitamin A concentration in the third trimester to storage in the fetal liver and utilization by the fetal tissues, and apparently have further studies in progress in an attempt to determine whether vitamin A concentrates can prevent this decrease in plasma vitamin A. Certainly much further work is necessary before the vitamin A requirement for pregnancy is definitely known.

Little is known about the exact needs of the pregnant woman for the various vitamins of the B complex. Ebbs (34) has summarized the present knowledge in regard to these vitamins and the part they may play in pregnancy. The following from his summary is a picture familiar to all of us who have worked with similar cases: "We have been impressed by the changes which occurred when the intake of vitamin B_1 was doubled or trebled in women attending the antepartum clinic. Many of the minor aches and pains and numerous complaints disappeared. The mental attitude of many of these patients changed from one of apathy and discontent to one of interest in the outcome of their pregnancy." Lockhart *et al.* (59), using the excretion peak in the urine as an indication of the subject's thiamin status, found that approximately three times as much thiamin was required in titrating the excretion peaks during late pregnancy as was required under normal conditions. These workers suggest that the requirement for thiamin is increased threefold during the latter part of pregnancy. This study was conducted on only 16 women and the value of the excretion test as an actual measure of the thiamin status of an individual is still subject to further investigation. Polyneuritis of pregnancy has been recognized for some time by various workers as due to a deficiency of thiamin. While studying the nutrition of a group of women at the Boston Lying-in Hospital, the author was asked to take nutrition histories on two cases of severe polyneuritis of pregnancy. Both women had had very poor food habits over a long period of time and their diets were extremely low in thiamin as well as in many other essential nutrients. To this long history of poor food intake was added a period of extreme nausea followed by the onset of polyneuritis. Both patients were treated with vitamin therapy and a good diet as rapidly as they were able to take it. Both women had normal infants but neither recovered completely from the symptoms of paralysis until several months following delivery. These two patients also had low plasma values for ascorbic acid, low hemoglobin levels, and low red cell counts, showing that they were suffering from multiple deficiencies and that the polyneuritis which developed was merely the first specific clinical manifestation. We observed that considerable benefit was derived when thiamin was given to patients with nausea in early pregnancy and that it was helpful in many cases of pernicious vomiting. McGoogan (60) has reviewed the literature on severe polyneuritis due to vitamn B deficiency in pregnancy, and he reports 145 cases available for study. He concludes that pernicious vomiting of pregnancy may result in a vitamin B_1 deficiency with a severe polyneuritic syndrome.

The ascorbic acid requirement has been shown to be increased considerably during the latter part of pregnancy. The recent work of Lund and Kimble (61) substantiates the earlier findings of Teel *et al.* (62) regarding the fetal-maternal relationship of this vitamin, namely that the plasma level in the cord blood of the infant is always higher than that of the maternal blood and that when the latter value is low the difference between the two is proportionately greater. Lund and Kimble were successful in maintaining an adequate maternal plasma level in the latter part of pregnancy by diet alone, whereas Teel, Burke and Draper in 1938 had found that a diet containing only 50 mg. ascorbic acid would not do so. Plasma levels of ascorbic acid reflect the current dietary intake and not the degree of saturation of the tissues in general. At the time of the latter study it was not understood why women with extremely low plasma values usually showed no clinical symptoms of ascorbic acid deficiency, but it now seems evident that their tissues still contained sufficient vitamin C to prevent the appearance of clinical symptoms, despite their low plasma values. None of the published studies include any cases in which the maternal plasma value was zero so we do not know what the maternal-fetal relationship would be in such a case. It seems reasonable, however, to suppose that the fetus would suffer and that fetal scurvy could result if the condition persisted.

The literature lacks satisfactory evidence as to the vitamin D requirement during pregnancy. Until more exact knowledge is available, it would seem wise to follow the allowance of 400 to 800 I.U. daily recommended by the National Research Council.

Vitamin E is of interest in its possible relation to successful pregnancy. However, it has never been definitely proved essential to humans, and the possibility of deficiency in the average human diet is considered relatively remote. The relation of vitamin E to successful pregnancy is more a problem of medical than of dietary concern. Shute (63–65) discusses this problem.

Hemorrhagic disease of the newborn is prevented by administration of vitamin K to the mother either by mouth for a period of two weeks before delivery, or parenterally at the onset of labor. Since this is purely a medical problem, no attempt will be made here to cover the recent literature on the subject.

CONCLUSION

In conclusion it can be said that, despite still large gaps in our knowledge as to the exact requirements and functions of many of the specific nutrients during pregnancy, there can be little doubt that nutrition of the pregnant woman is sufficiently important to normal growth and development of the fetus and the health of the mother to warrant an important place in all prenatal care programs. That proper nutrition during pregnancy is an important

factor in reducing the incidence of stillbirths and early neonatal deaths has not been widely appreciated. If a good diet is a safety factor to the mother and preventive of certain forms of toxemia, that alone is extremely important, since toxemia is still one of the major causes of maternal mortality during pregnancy and an important cause of fetal mortality, premature births, and neonatal deaths. The benefits which may be derived from effective and intelligent nutrition teaching during pregnancy are overwhelmingly in favor of making this information a part of all prenatal care. Bethell (46) says: "The prevalence of suboptimal nutrition, as measured by present standards, and the degree of improvement after dietary instruction testify to the value of nutritional evaluation and therapy as a part of prenatal care for the population at large as well as for the distinctly underprivileged in large cities." He adds that, where hospital or clinic facilities are available, the cost of such services together with examination of the blood, as a part of standard prenatal care would be about five dollars per case. This would seem a moderate price to pay for increased maternal health, lowered maternal mortality, lowered infant morbidity and mortality, together with marked improvements in child health and development.

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Nucleic Acids and Tissue Growth

It has been generally recognised that two types of nucleic acid exist: the one, ribonucleic acid, contains the sugar ribose and uracil as one of its pyrimidine bases; the other, desoxyribonucleic acid, contains the sugar desoxyribose and the methylated base thymine in place of uracil. Recent work has drawn attention to the probable importance of the nucleic acids and nucleoproteins in animal tissues, particularly in connection with cellular activity, and has suggested that nucleoproteins containing pentose nucleic acids ("ribonucleoproteins") play a special role in protein synthesis and tissue growth. Although the association between the desoxyribonucleic acid of cell nuclei and the processes of cell division has been known for a long time, attention has only recently been attracted to the nucleoproteins containing pentose nucleic acid which are now known to be constituents of many self reproducing filterable viruses and which appear to be abundant in the rapidly growing cells of embryos, tumours and regenerating tissues. *Excerpts from an article entitled Nucleic Acids and Tissue Growth in the July Nutrition Abstr. & Rev. 14: 1, 1944 in which the evidence is reviewed by J. N. Davidson and C. Waymouth, University of Aberdeen. Reprints of this article, priced at 1 s. each, may be obtained on application to the Rowett Institute, Bucksburn, Aberdeen, Scotland.*

The Concept of Organic Unity

The infinite complexity of any living organism is a challenge to man's usual habit of finite thinking. Therefore, in the attempt to understand even a one-celled animal, it has been divided into the cytoplasm and nucleus. But when we strive to reassemble the creature so that it functions properly again, we still find ourselves in the frustrated company with all the king's horses and all the king's men. Moreover, when through special interest the focus of an investigator's individual attention becomes fixed on a part, the latter grows for him in significance until it often attains the power of a dominant minority. And beyond these considerations we are faced with the age-old problem of the relative significance to human beings of the terms mind and matter. Where does the physical body end and consciousness begin? Or does the latter exist free in the cosmos and pounce demon-like or godlike into the prefabricated animal carcass? It is not my purpose in this essay to carry on that discussion. But it is necessary to point out that the only way in which man has been able to deal with the imponderable forces which he has sensed to be present, either within or about him, is by abstract words or symbols. There is, however, a peril in this process, the danger that the possible, wished for or probable reality for which a given abstraction stands may be obscured by the poignant connotation of the symbol itself, which then takes on the fixed nature of a reality. This widespread insensitiveness to, or misinterpretation of, symbolic impact has perhaps been one of the great obstacles to a prompter, wider acceptance of any threat to traditional standard beliefs. Furthermore, in the very term "psychosomatic" the same danger still lurks about the first half of the Janus-faced word. Even the hybrid contraction "psychosomatic" is unhappy, coined as it was in order to connote, at least by the elimination of one syllable, a more intimate relationship between mind and body. And so, as studies in human constitution have proceeded, increasing dissatisfaction has developed with the term psychosomatic. By virtue of its structure it still implies a dichotomy, criticism of which was earlier implicit in Jelliffe's phrase "psychosomatic monism." Consequently, until a chemical and physical formulation is achieved which will explain the two expressions of energy which are now called reason and emotion on the one hand and somatic physical phenomena on the other, we are inevitably constrained to use abstractions for things sensed but imponderable and unknown. We shall have to accept frankly the statement of William James that "All our abstracts must be confessed to be but imperfectly imaginable things."—*Draper, G.: The Concept of Organic Unity and Psychosomatic Medicine, J.A.M.A. 124: 767 1944.*

STUDY OF THE NUTRITIONAL QUALITY OF DIETARIES BY CHEMICAL ANALYSIS[1]

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THE nutritional adequacy of the dietary of population groups can be measured by one of several techniques. The simplest and least quantitative is the *dietary survey* in which a record of the foods consumed by a representative group over a 24-hr. period is obtained by mail or by personal interview. The results are usually compared with a list of essential food categories, such as the "basic 7" formulated by the Nutrition Programs Branch of the U. S. War Food Administration. A typical report of a dietary survey is found in the recent literature (1).

More accurate data are obtained by recording the 2-day *dietary history* of a smaller group by personal interview. Models of measured quantities of several foods are displayed to assist the informant in describing the sizes of servings. From these semiquantitative data the food intake is approximated and made the basis for classifying the adequacy of diets into broad groups. Wiehl's article (2) on the diets of aircraft workers is a fine example of the dietary history technique.

In the *food list method* the homemaker reports to an interviewer, from memory, the kinds and quantities of food consumed in the home during the last 7 days.

A fourth method, *food consumption survey*, is illustrated by the classic study of Stiebeling and Phipard (3) in which an inventory is taken of the weight of the food on hand in each home at the beginning and end of a week's period and a record is made of the food brought into the house during the interim. From these data the nutritive value is computed from standard food tables. In such a survey the intake of each nutrient can be approximated and the adequacy of the diet determined by comparison with the National Research Council recommended dietary allowances (4). An improvement in this survey technique has been developed by Mack (5).

A fifth, the *food weight method*, consists in keeping a record of the weight of food consumed by individual members of the household rather than of the family as a whole. McHenry (6) has employed this method in a nutrition study in Toronto.

Each of these methods has its particular field of usefulness, yet none can accurately determine the actual intake of nutrients. Variations in the nutrient content of each foodstuff, in the losses during food preparation and service, and in the size of servings, combine to make calculations unreliable. It would seem that a measure of the daily intake of nutrients can best be obtained by a sixth procedure, *dietary analysis*, in which the food about to be consumed by each subject is analyzed in the laboratory. Comparison of these results with the recommended allowances serves to determine the adequacy of the daily dietary in terms of the age, sex, and physical and physiological activity of each subject.

This dietary analysis technique has been used by Winters and Leslie in assessing the adequacy of the diet of population groups (7). Few studies have been made in the past, partly because the chemical methods for measuring the various vitamins have only recently become satisfactory but chiefly because such a study is expensive and requires a large technical staff. Precise data may be obtained on a relatively small group by analyzing each meal for those nutrients most commonly lacking in the dietary. The validity of conclusions based on these data may then be established by the dietary survey technique in which the food habits of this group are compared with the food habits of the nation as a whole.

This paper reports the results of the analysis of 71 dietaries (213 separate meals) collected during August, September, November, and December 1943, from homes in urban and suburban areas near Boston and New York. The thiamin, riboflavin, niacin, ascorbic acid, calcium, and iron content of each meal was measured.

Concurrently, a dietary survey was conducted on a nationwide basis. The 3336 returns from a mailing to 5000 families were tabulated and compared with similar returns on the same questionnaire sent to the 71 test families. It was established that the nutrient intake of the test sample was definitely better than that of the large population sample. Thus any conclusions as to deficiencies present, when drawn from the analysis of the food of the test group, may be regarded as conservative in relation to the nation as a whole.

This investigation was prompted by a finding (8) of the U. S. Food and Drug Administration, based on expert testimony, that "the average of the daily per capita food supply purchased for home consumption, as shown by a nationwide survey in 1942, . . .not adjusted for losses in preparation and cooking or through discarding uneaten portions" was above the recommended allowance for thiamin, iron, and calcium, and only slightly below that for riboflavin and niacin. Further, it was found that all five nutrients were above recommended allowance levels if one assumed that all family flour was enriched according to 1943 standards at which time the enrichment of all white baker's bread was mandatory (9).

If this statement is true, it attests the effectiveness of the enrichment program in alleviating the malnutrition of this country. It seemed very important, however, that the quality of the American dietary be measured by a more accurate technique so that its adequacy might be reassessed.

EXPERIMENTAL

Subjects. First in Boston, and later in New York, women from the families volunteering to participate were invited to a luncheon at which the purpose of the study was explained. Questionnaires, when completed, served to give the age, weight, and occupation of each family member, information on the time of day each meal was served, and the approximate family income. Information was also obtained as to those who customarily ate meals away from home, whether a lunch was carried, and where this meal was eaten.

On the basis of this information, one person was selected from each family in an attempt to distribute the age, activity, and income of the group in accordance with recent census data. No child under 5 years of age, and no one whose dietary habits had been altered because of illness, was included (Table 1).

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Collection. Before collections were started, each family was told that 3 collections would be made at any time during the following 8 weeks. All were asked not to alter their food habits, for this might invalidate the study. They were assured that the individual data would be confidential. No family knew in advance which member was to be the subject. If changes were made in dietary habits, it is likely that food selection was improved.

The sample collector was provided with a portable insulated box containing carbon-dioxide ice. He appeared at a home just before mealtime, waited until the food had been served, then took the meal from the selected member, together with additional portions of the main meal and of dessert which the subject claimed would normally have been eaten. Generally this was confirmed by the collector and no plate waste was assumed. Duplicate samples of all foods consumed since the previous meal were obtained from the same sources, to the extent this was possible, and included with the other sample. Tea, coffee, milk and liquids other than water were included. This food was placed in 1-pt, waxed-paper cartons and inserted in the insulated box. At the time the sample was collected, a record was made of the food items in each meal, the time and date of collection, and whether between-meal snacks were habitually consumed.

TABLE 1

Age, physical activity, and economic status of subjects of Dietary Analysis Group

AGE	ADULTS		ADOLESCENTS		CHILDREN		
	Female	Male	Female	Male	Female	Male	Totals
yr.							
5–9					8	8	16
10–14					6	6	12
15–20			3	5			8
21–30	11	6					17
31–40	6	10					16
41–50		2					2
Totals	17	18	3	5	14	14	71
Physical activity							
Sedentary	1	2	0	0	0	0	3
Moderately active	13	11	2	3	0	0	29
Active	3	5	1	2	14	14	39
Totals	17	18	3	5	14	14	71
Family income (*per yr.*)							
$1,000–2,000	2	1	2	1	3	3	12
2,000–3,000	9	7	1	4	5	6	32
3,000–5,000	6	6			5	5	22
5,000 and over		4			1		5
Totals	17	18	3	5	14	14	71

To avoid changes in the selection of diets, the breakfast, lunch, and dinner were collected from each subject on 3 different days. While it is true that what one eats in any meal is influenced by the preceding meal, it was hoped that, on the whole, the meals of the other subjects would minimize this effect. On the other hand, there was no obvious, practical way to counteract the changes in diet selection which undoubtedly would be made if the 3 meals of each subject were collected during the course of a single day. Collections were scheduled so that an equal number were taken on each day of the week. In some cases the subjects were sampled while eating away from home. The randomness of these particular samples may have been impaired because arrangements were made to meet the subjects at mealtime. They were instructed to select a customary lunch; if they did not, it is likely the lunch was better than usual.

In the Boston study, each meal was taken directly to the laboratory and the cartons transferred to a large carbon-dioxide refrigerator until analyzed. In the New York study, the collections were placed in a refrigerated shipping carton, expressed to Boston, and transferred to the laboratory refrigerator on arrival the following morning. Since in either case the samples were solidly frozen within a few minutes of collection, shipping distance was of no importance, for preliminary studies on typical restaurant meals indicated no measurable loss in thiamin, riboflavin, niacin, or ascorbic acid when packed and stored in this manner for 4 days. All samples were analyzed within 3 days.

Analysis of Samples. Within 4 hours after arrival in the laboratory each sample was analyzed for ascorbic acid (10). Thereafter estimations of thiamin (11), riboflavin (12), and niacin (13) were made. Solutions of ash were prepared according to standard methods (14) and used in the estimation of calcium (15) and total iron (16) content.

The intake of the above nutrients was calculated for the 3 meals of each subject and the daily totals of each were compared with his requirements as stated in the recommended allowances.

RESULTS AND DISCUSSION

Average Daily Intake. There is very good agreement (Table 2) in the riboflavin, niacin, calcium, and iron intakes of the Boston and New York groups, but less in the thiamin and ascorbic acid data. Possibly this is due to an actual difference in food habits, to change in season, or to the small number of subjects. The two sets of data are so similar, however, that there can be little objection to combining them for analysis and study.

The adequacy of the average daily intake may be determined by comparison with the daily dietary allowance recommended for each subject. It is to be noted that the average daily intake of the whole group as compared with the average dietary allowance recommended for a group of this composition (4) was sufficient in ascorbic acid, calcium, and iron but inadequate in thiamin, riboflavin, and niacin (Table 2).

It is erroneous to express the adequacy or inadequacy of the dietary of a population in terms of the average supply of nutrients available on a per capita basis, since an equal distribution of nutrients within a large population group is never achieved. In the present study, for instance, the intake of thiamin by the group of 28 children averaged 1.34 mg. or 125 per cent of the calculated allowance for this group. One might conclude from this that the thiamin intake of the children was more than adequate, yet the individual data show that one third of the children failed to get the recommended allowance of thiamin.

Incidence of Adequate Dietaries. It is much more satisfactory to calculate the percentage who receive the desired dietary intake by means of comparison with accepted standards (Table 3). Only 7 per cent of the group of 71 subjects received the recommended allowances of all the nutrients measured and all of these were children. Thus relatively few attained this standard of good nutrition.

The following percentages of the total group received the recommended allowance of each of the following: niacin 25 per cent, riboflavin 37 per cent, thiamin 38 per cent, ascorbic acid 52 per cent, calcium 63 per cent, iron 72 per cent. A substandard intake of vitamins was more common than that of minerals, and members of the vitamin B complex were more commonly deficient in the diet, with

TABLE 2

Amounts of nutrients received (in 3 meals) by 71 subjects, presented according to age, sex and region

SUBJECTS*	NO.	AVERAGE DAILY INTAKES					
		Thiamin	Riboflavin	Niacin	Ascorbic Acid	Calcium	Iron
		mg.	*mg.*	*mg.*	*mg.*	*gm.*	*mg.*
Adult women							
A	7	1.04	2.18	13.3	88.0	0.85	13.9
B	10	1.30	1.58	12.7	75.0	0.94	14.1
Total	17	1.21	1.83	12.9	80.4	0.90	14.0
Adult men							
A	8	1.20	1.49	13.4	82.0	1.16	16.2
B	10	1.69	2.20	12.9	94.1	1.35	17.0
Total	18	1.47	1.88	13.1	88.7	1.26	16.6
Adolescents							
A	3	1.13	1.43	8.4	31.2	0.87	15.8
B	5	1.59	1.87	12.5	75.5	1.18	18.8
Total	8	1.42	1.71	10.9	59.0	1.06	17.6
Children							
A	11	1.33	2.13	11.6	82.5	1.29	14.5
B	17	1.34	1.87	11.2	92.5	1.29	12.0
Total	28	1.34	1.97	11.3	88.6	1.29	13.0
Grand totals							
A	29	1.20	1.89	12.2	78.2	1.10	14.5
B	42	1.44	1.88	12.1	86.6	1.20	14.5
All subjects	71	1.35	1.88	12.1	83.3	1.17	14.6
Av. recommended dietary allowance** for all subjects		1.47	2.18	14.9	72	0.98	12.0

* Groups A and B refer to Boston and New York subjects' respectively.

** Average recommended allowance calculated in terms of N.R.C. allowances (4) for all subjects.

TABLE 3

*Percentages of subjects receiving (in 3 meals) total N.R.C. allowances**

SUBJECTS**	NO.	AVERAGE DAILY INTAKES					
		Thiamin	Riboflavin	Niacin	Ascorbic acid	Calcium	Iron
		%	%	%	%	%	%
Adult women							
A	7	0	43	29	57	86	71
B	10	20	10	20	50	70	80
Total	17	12	23	24	53	76	76
Adult men							
A	8	0	0	13	38	50	88
B	10	40	20	0	90	90	90
Total	18	22	11	6	67	72	89
Adolescents							
A	3	0	0	0	0	0	33
B	5	60	20	40	40	20	60
Total	8	38	13	25	25	13	50
Children							
A	11	73	82	45	45	64	82
B	17	59	59	35	53	65	53
Total	28	64	68	39	50	64	64
Grand totals							
A	29	28	41	28	41	59	76
B	42	45	33	24	60	67	69
All subjects	71	38	37	25	52	63	72

* Five subjects, or 7%, received full allowance of all 6 nutrients.

** Groups A and B refer to Boston and New York subjects, respectively.

niacin the most deficient of all. The diets of the children were below recommended allowances for thiamin, riboflavin, and niacin less often than those of the adults, yet the latter were better fed with respect to ascorbic acid, calcium, and iron.

In formulating the recommended dietary allowances, (4) the Food and Nutrition Board attempted "to derive a table of allowances which would represent the best available evidence on the amounts of the various nutritive essentials to include in practical diets. . . . The quantities given were planned to provide not merely the minima sufficient to protect against actual deficiency disease but a fair margin above this to insure good nutrition and protection of all body tissues." If one assumes that this "fair margin" is approximately one third above the "protective" level for each nutrient and then compares data against this level, one has a more conservative basis for estimating the seriousness of dietary inadequacy.

The results of a calculation of the percentage of the subjects receiving at least 75 per cent of their recommended allowances are presented in Table 4.

TABLE 4

*Percentages of subjects receiving (in 3 meals) 75 per cent of N.R.C. allowances**

SUBJECTS**	NO.	THIAMIN	RIBOFLAVIN	NIACIN	ASCORBIC ACID	CALCIUM	IRON
		%	%	%	%	%	%
Adult women							
A	7	29	86	57	63	86	100
B	10	40	30	50	50	80	90
Total	17	35	53	53	59	82	94
Adult men							
A	8	50	13	37	75	63	100
B	10	60	40	30	100	100	100
Total	18	56	28	33	89	83	100
Adolescents							
A	3	33	33	33	0	67	67
B	5	60	40	40	60	60	80
Total	8	50	38	38	38	63	75
Children							
A	11	100	100	73	73	100	100
B	17	100	89	65	76	100	82
Total	28	100	93	68	75	100	89
Grand totals							
A	29	62	66	55	66	83	97
B	42	72	57	50	74	90	88
All subjects	71	68	61	52	71	87	91

* Fifteen subjects or 21%, received 75% of allowance of all nutrients.

** Groups A and B refer to Boston and New York subjects, respectively.

Only 21 per cent of all the subjects obtained a "protective" amount of all nutrients measured, and 12 of the 15 subjects so protected were children. A "protective" intake of niacin was found in the dietaries of only 52 per cent, of riboflavin in 61 per cent, of thiamin in 68 per cent, and of ascorbic acid in 71 per cent of the subjects. The calcium and iron intakes were somewhat better, with 87 and 91 per cent of the subjects, respectively, receiving "protective" amounts.

It would have been interesting if a similar table comparing the intakes of this group with the Minimum Daily Requirements as defined by the U. S. Food and Drug Administration, could have been presented. However, the minimum requirement of riboflavin has not been defined for children between 6 and 11 years of age, and that for niacin has not been defined for any age group. When the niacin data were omitted and a conservative riboflavin minimum of 1.0 mg. for 6 to 11-year-old children was assumed, it was calculated that only 35 per cent of the

subjects received the just-mentioned minimum. This figure would be reduced substantially if the niacin data could have been compared with a standard of niacin intake like that of the Food and Nutrition Board, for niacin was the nutrient most commonly deficient.

It is unfortunate that data on each nutrient for each meal of each subject are too voluminous for publication here. In these data there are indications such as the following: that the diet of adults fell below that of children in thiamin, riboflavin, and niacin content, largely because the adults' breakfasts were inferior in these nutrients to those of the children; that ascorbic acid was not the "breakfast vitamin" as is commonly supposed, for breakfasts usually contained less of this vitamin than dinners, even when citrus fruits were on the breakfast menu; that dinner was the most nutritious meal, furnishing more of each nutrient measured than either lunch or breakfast; and that children were the best fed of all age groups.

TABLE 5

Summary of results of dietary survey, showing, for each of the basic 7 food groups, percentages of subjects whose dietaries included foods from these categories

BASIC 7 GROUP	FOOD CATEGORY	DIETARY ANALYSIS GROUP (71 SUBJECTS)	NATIONAL SURVEY GROUP (3336 SUBJECTS)
		%	%
I	Green and yellow vegetables	77	68
II	Citrus fruits, tomatoes, raw greens	90	87
III	Potatoes, other vegetables, fruits	89	96
IV	Milk and milk products	92	75
V	Meat, fish, poultry, eggs or dried beans, peas, nuts	100	98
VI	Bread, flour, and cereal: whole grain or enriched	95	94
VII	Butter and fortified margarine	94	94
Percentage of all subjects in each group whose dietaries included foods from all the above categories		59	41

Comparison With Dietary Survey. Concurrently with this dietary analysis a dietary survey was conducted, covering 5000 families in all parts of the United States and the 71 families whose diets had been analyzed. A letter was sent to each housewife asking her to fill in a printed questionnaire listing all food, and liquids other than water, consumed by a member of the family on a specified day of the week. Completed questionnaires were received from 3336 persons, with a fairly even proportion for each day of the week. The replies were analyzed in terms of the basic 7 categories (Table 5).

The food habits as shown by the national sampling were poorer than those of the 71 families that had been studied intensively. It is evident, therefore, that the laboratory findings are conservative and that the dietary intake of the nation as a whole was not adequate at the time these studies were made.

While 59 per cent of the dietary analysis group (Table 5) consumed the basic 7, chemical analysis of the diets revealed that only 7 per cent received optimum nutrition and only 21 per cent "protective" nutrition. In general, the subjects consuming the basic 7 received a more nutritious diet than those who did not, indicating the value of the basic 7 teaching in the improvement of food habits. It is evident, however, that adherence to the basic 7 method of food selection is no guarantee of good nourishment.

It was not possible to record the weight of each serving of the meals collected for analysis. This is unfortunate, for we could thus have obtained data on the errors involved in the usual practice by which the adequacy of dietaries is calculated from the tables of food composition. These tables usually present data on raw foods, and deductions are seldom made for losses in nutrients during food preparation and service. If one makes the doubtful assumption that a full (standard) portion was taken with each serving of food in the samples collected, and calculates the nutrient content from a representative food table (17), one finds that the calculations for iron and calcium agree with the analytical results. However, only about 70 per cent of the thiamin, riboflavin, and niacin, and 50 per cent of the ascorbic acid in these 210 meals, as determined by calculations based on the above-mentioned food table, were actually found by chemical analysis.

SUMMARY AND CONCLUSIONS

1. The thiamin, riboflavin, niacin, ascorbic acid, calcium, and iron contents of complete meals which subjects were about to eat in the home or restaurant, have been determined by chemical analysis. Three meals from each of 71 subjects were included in the study. All samples were taken in July, August, November, and December 1943. In selecting the subjects an attempt was made to obtain a distribution of age, sex, activity, and economic status similar to that of the nation as a whole. All were located in suburban and urban areas near Boston or New York.

2. The adequacy of the diets of these subjects was measured by comparison with the recommended dietary allowances of the Food and Nutrition Board, National Research Council.

3. When so measured, the average daily intake for this group was adequate in ascorbic acid, calcium, and iron, and inadequate in thiamin, riboflavin, and niacin.

4. However, only 7 per cent of the subjects received an adequate intake of *all* these nutrients, while the percentages of the subjects receiving recommended allowances of certain nutrients were as follows: niacin 25 per cent, riboflavin 37 per cent, thiamin 38 per cent, ascorbic acid 52 per cent, calcium 63 per cent, and iron 72 per cent.

5. Children received their recommended allowance of thiamin, riboflavin, and niacin more often than adults, but adults were more often adequately fed as to ascorbic acid, calcium, and iron.

6. Assuming that three fourths of the N. R. C. recommended allowances represents a "marginal" level of intake below which actual deficiency disease may develop, it was found that only 21 per cent received a "marginal" intake of all nutrients. The following percentages received three fourths of the allowances for specific nutrients: niacin 52 per cent, riboflavin 61 per cent, thiamin 68 per cent, ascorbic acid 71 per cent, calcium 87 per cent, and iron 91 per cent.

7. Only 35 per cent of the subjects received the minimum daily requirement of the Food and Drug Administration in thiamin, riboflavin (assuming 1 mg. for 6 to 11-year-old children), ascorbic acid, calcium, and iron. This percentage would undoubtedly be reduced if a minimum standard of niacin requirement were available.

8. A dietary survey of a national sample of 3336 persons distributed throughout the United States revealed that the quality of their food selection was definitely inferior to that of the 71 families whose diets were examined by chemical analysis. Thus it is probable that the dietary intake of the nation at the time this study was made was even less adequate than that of the small group whose diets were analyzed.

9. While 59 per cent of the dietary analysis group made daily selections from all basic 7 food categories, only 7 per

cent received the full recommended allowance of the 6 nutrients, while 21 per cent received a "protective" intake of three quarters of the N.R.C. allowance. Generally those who selected foods from the basic 7 groups were better nourished, but adherence to the basic 7 is no guarantee of good nourishment.

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Professions Needed in Peru: That of the Dietitian

The application of the "technique of dietetics" which Professor Escudero defines as "the scientific study of the operations which are applied to foods and the changes which they experience, with the object of learning to utilize food in a rational manner, not only for the sick man but for the healthy one as well," and the importance which an adequate diet is continually acquiring in the field of medicine and public health, have led to the creation of a new profession, that of dietetics.

It is necessary to define as clearly as possible the preparation required for those who practice dietetics, and their particular functions, because frequently it is observed that in hospitals and other institutions for public assistance one meets persons who call themselves dietitians and who know how to cook—a technique which surely every dietitian should possess—but who are very far from being able to carry out the other important functions which are within the capacity of the true dietitian.

Because of the profundity and universality of the subject of nutrition, the dietitian receives university training which gives her a scientific basis for her knowledge of the nutritional requirements of the well man and all the information which will enable her to assist the doctor in feeding the sick. For the latter she acquires a general knowledge of pathology which permits her to interpret the orders of the doctor, to whom she is a helper as valuable as the pharmacist.

Her knowledge should permit her to solve for herself the nutritional problems of well children and adults, considered individually and collectively.

The dietitian should be able not only to guide the feeding of the healthy and to help the doctor in feeding the sick, but she should also be prepared to teach in the schools all that which relates to the biologic, hygienic and economic aspects of foods and nutrition. She should also be prepared to take charge of public or private projects which are related to industrial feeding.

It is clear that the dietitian has a wide field of action and an important social function to fulfil; therefore, it is essential that she have good scientific preparation and suitable knowledge of economics, medicine, and social problems.

Professor Pedro Escudero, well-known authority in this field, who directs the National Institute of Nutrition of Buenos Aires of which the School for Dietitians is a part, says, speaking of the dietitian: "With the medical specialist in nutrition, she constitutes a perfect functional unity maintained by an analogous body of knowledge. The physician makes a diagnosis, orders and prescribes treatment for the sick, formulating a dietetic prescription similar to the pharmaceutical prescription; in turn, the dietitian knows the correct manner for carrying out that which has been indicated by the doctor."

The erroneous concept is generally held that the dietitian should be a nurse who has specialized in dietetics. Clearly, this is possible, but when we consider the requirements of the dietitian's program of study, we can see that the nurse's knowledge is not absolutely necessary and that possibly a greater advantage is obtained when young women with a general cultural background and, if possible, the degree of bachelor of science, enter the training school for dietitians.

The School for Dietitians in Buenos Aires allows two scholarships annually for each Latin-American country. In Peru no one has taken advantage of these scholarships in spite of the fact that they very generously allow housing, maintenance, clean uniforms and medical care for each fellow during her three years of study. Various Latin-American countries, however, have sent young women to pursue these studies, young women who later have given their services in the institutions of public welfare in their respective countries.

Peru was the first Latin-American country to organize popular restaurants, and in connection with its policy of protecting the nutrition of its people, counts a growing number of school lunches, dining rooms for pregnant and nursing women, milk stations, and so on. Peru needs a goodly number of dietitians to direct and supervise the functioning of these institutions from the point of view of technical dietetics.

The popular restaurants and in general the institutions for the protection of nutrition should have adequate direction, not only to ensure a better utilization of food, but also to make it possible to study the results obtained by the food policy of the government in order to guide action and improve methods.

The training of dietitians in a national institute of nutrition is demanded in the name of the conservation of our human resources, for the nutritional condition of the population in general is notoriously poor. The investigations to be carried out among our native peoples, on the coast and in the *selva*, the value of food products such as *quinoa*, and many others, present an immense field of study for the improvement of the nutrition of our population. Moreover, and this is not the least important, dietetics should be a splendid field for the Peruvian young woman because the profession of dietetics properly is one for women.—*From an article by Dr. Manuel Salcedo Fernandini, in Historia: Revista de Cultura, Vol. 2, Jan.-June 1944, Lima, Peru, as translated by Frances MacKinnon, 1942-43 President of the American Dietetic Association, now in the service of the Children's Bureau, U. S. Department of Labor, and stationed at Lima.*

BLOOD REGENERATION IN WOMEN BLOOD DONORS

I. Effect of Generous Amounts of Meat and Milk in the Diet[1]

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THE importance of dietary protein in blood formation and regeneration has been established but the use of high-protein feeding in simple anemia or following donations of blood has not been widespread. This may be attributed in part to a lack of clear-cut quantitative demonstrations of the value of a generous protein intake in blood formation, especially hemoglobin, in human subjects. The volunteer blood donor program offers a splendid opportunity to study this problem and to determine the effect of a liberal dietary supply of protein and other nutritional factors on blood building in normal subjects.

The nutritional and medical aspects of the problem of blood regeneration and their application to the average donor have been reviewed by McKibbin and Stare (1). Protein, iron, copper, and the erythrocyte maturation factor are known to be essential; certain members of the vitamin B complex, ascorbic acid, vitamin D, and the calcium: phosphorus ratio may operate in a nonspecific way; whereas the relation of still other factors to blood formation remains unstudied or obscure. Protein and iron are the two nutritional essentials especially emphasized by Turner (2) in her dietary recommendations for the blood donor.

The individual with simple hypochromic anemia has some problems in common with the blood donor; namely, to form hemoglobin and red cells. There is evidence from this laboratory that anemia often associates itself with a low-protein intake. For example, Leverton and Marsh (3) have demonstrated that increasing the protein intake leads to an increased hemoglobin concentration of the blood; Hahn and Whipple (4), that a low-protein intake will cause limited hemoglobin production in standard anemic dogs; and Fowler and Barer (5), that iron therapy stimulated hemoglobin formation in simple anemia and maximum response occurred at the end of 10 or 12 weeks, after which there was a gradual reduction in the hemoglobin value although not to a point as low as the pretreatment level. Since lack of iron is by no means always the limiting factor in cell and hemoglobin formation, Leverton and Marsh (6) have suggested that a well-balanced optimum diet holds more promise of a permanent general improvement than iron medication in the treatment of simple hypochromic anemia in young women.

The study being reported is the result of combining group enthusiasm for donating to the local blood bank with an attractive feeding program in order to secure subjects so that research findings could be obtained on a number of college women as they "recovered" from giving a pint of blood. The purpose was to compare the effect on blood regeneration in women blood donors of a daily intake of 50 gm. protein with one of 75 gm., in an effort to determine the practical value of foods in generous amounts in cases such as nutritional anemia where the concentration of formed elements of the blood must be increased.

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EXPERIMENTAL PROCEDURE

Seventeen healthy college women volunteered as blood donors for this study during the fall and winter of 1943–44, 11 gave 2 donations, 16 weeks apart, and 6 gave 1 donation. The young women were given a constant weighed basal diet for 2 weeks before and 45 days after each blood donation. The foreperiod was used in an effort to minimize the influence of the self-chosen diets that immediately preceded the period of dietary control. The 11 subjects who gave 2 donations were on self-chosen diets for 6 weeks between the first and second period of dietary control. For 45 days following the first donation either meat, or milk and cheese, in addition to the amounts in the basal diet, were given to increase the daily protein intake by 25 gm. After the second donation only the basal diet was given for 45 days. The 6 subjects who gave only one blood donation received the basal diet without supplementation.

The basal diet was planned to contain .9 gm. protein per kilogram body weight, and to meet the National Research Council recommended daily allowances for vitamins. The iron content was limited to approximately 8 mg. daily, however, since Elvehjem (7) has presented evidence to indicate that regardless of the source and level of the protein intake, if the iron intake is unlimited some hemoglobin will be formed at the expense of body proteins, while Leverton (8), on the other hand, has shown that 8 mg. iron daily is a generous amount for the average young woman (not a blood donor) when optimum amounts of other nutrients are provided.

The nutritive value of the basal diet for the average subject with and without the additional amounts of meat or milk and cheese is shown in Table 1. Approximately 65 per cent of the total protein in the basal diet was of animal origin.

The food preparation and serving were done quantitatively in the Nutrition Laboratory where the subjects ate all their meals.[2] The menu for the basal diet was planned for a time unit of 1 week and repeated identically each week of the study. It included:

450 gm. lean meat a week or 90 gm. on each of 5 days	1 pt. milk daily
30 gm. fish, 1 day a week	60 gm. grapefruit juice daily
150 gm. egg a week	100 gm. cooked and 50 gm. raw vegetable daily
120 gm. potato four times a week	Enriched or whole wheat bread daily

Desserts of canned fruit in gelatin or ice cream made with a cornstarch and water base, plus 40 per cent cream
One to two apples daily if desired
Butter, sugar, and synthetic jelly ad libitum but not to exceed caloric need
Certain candies without chocolate, milk, or nuts; bottled soft drinks for social purposes
(The amounts noted are for an average subject)

The quantity of meat, eggs, milk, and bread varied according to the size of the subject so that the total basal diet furnished .9 gm. protein per kilogram body weight on the basis of the recommended weight for height and age of

[2] Grateful acknowledgment is made to the Corning Glass Works, Corning, N. Y., for supplying the baking and serving utensils.

each subject. For simplicity in discussion the protein content of the basal diet will be referred to as 50 gm. or the amount for a 56-kg. woman.

The same amount of the food supplement was given to all subjects. The meat supplement was given in one serving of 118 gm., usually at the noon meal, but the milk supplement (480 gm. milk plus 33 gm. American cheese) was distributed among the 3 meals. The additional calories supplied by the supplement were counterbalanced by the use of smaller quantities of the foods permitted ad libitum.

TABLE 1

Nutritive value of the diets of the blood donors (on basis of 56-kg. donor)

DIET	PROTEIN	CALCIUM	IRON	VITAMIN A VALUE*	THIAMIN	RIBOFLAVIN	ASCORBIC ACID
	gm.	*gm.*	*mg.*	*I.U.*	*mg.*	*mg.*	*mg.*
Basal diet**.....	50.0	0.86	8.16	3372	1.14	1.95	102
Plus supplement of meat.....	75.0	0.87	11.4	3403	1.31	2.19	102
Plus supplement of milk and cheese.....	75.0	1.72	9.8	5287	1.37	3.17	108

* Does not include butter which was permitted ad libitum.
** Copper content estimated at 2 mg.

Analysis of venous blood samples taken from each subject before breakfast was made one or two days before the donation and 7, 14, 21, 28, 38, 45, and 67 days following it, and included determination of hemoglobin, red cell count, cell volume, total serum protein, nonprotein nitrogen, and albumin: globulin ratio. Hemoglobin was determined by the method of Todd and Sanford (9) and the fully developed oxyhemoglobin read in a Sanford-Sheard photelometer. Sanford and Magath (10) centrifuge tubes with 1.6 per cent potassium oxalate (11) as the anticoagulant were used for cell volume determinations. The micro-Kjeldahl technique of Koch and McMeekin (12) with direct nesslerization was used for determining nitrogen from which to calculate the protein values.

RESULTS

A summary of the results of the blood tests is presented in Figure 1 and Table 2. The results of each of the tests made just before the donation of a pint of blood are labeled "donation value" and all the values obtained following the donation are expressed in terms of percentage of the donation value. This procedure relates each result to the blood value at the time of the donation and measures progress in terms of restoring the blood to that concentration. The data thus indicate both the extent and rate of regeneration. Similarity of results made it possible to combine the figures for the subjects who received the meat supplement with those for the subjects who received the milk supplement.

The percentage decrease in blood values resulting from the withdrawal of 500 ml. blood was not measured for 7 days, but at that time the values for the two levels were similar and did not reflect any differences attributable to a difference in protein intake. Beginning with the values on the fourteenth day, however, all the figures, except for serum protein, were higher when the subjects were receiving additional amounts of meat or milk (which meant the daily protein intake approximated 75 gm.) than when they had no supplement and the daily intake of protein was 50 gm.

The differences in regeneration between the supplemented and control periods are not of great magnitude but are consistently in favor of the supplemented period.

At the end of 45 days on either experimental diet the serum protein was the only value which had returned completely to the donation level. The hemoglobin values and subsequently the color index showed the least progress toward restitution. After 3 additional weeks on self-chosen diets the concentration of hemoglobin and red cells was slightly higher when the subjects had had a daily protein intake of 75 gm. for the 45 days following the donation.

The figures for volume and color indices indicate that at either level of protein intake the subjects' red cells were smaller and contained less hemoglobin at 45 and 67 days following withdrawal of 500 ml. blood than prior to its loss. The higher level of protein intake, however, produced a cell which, although smaller in size than its predecessor

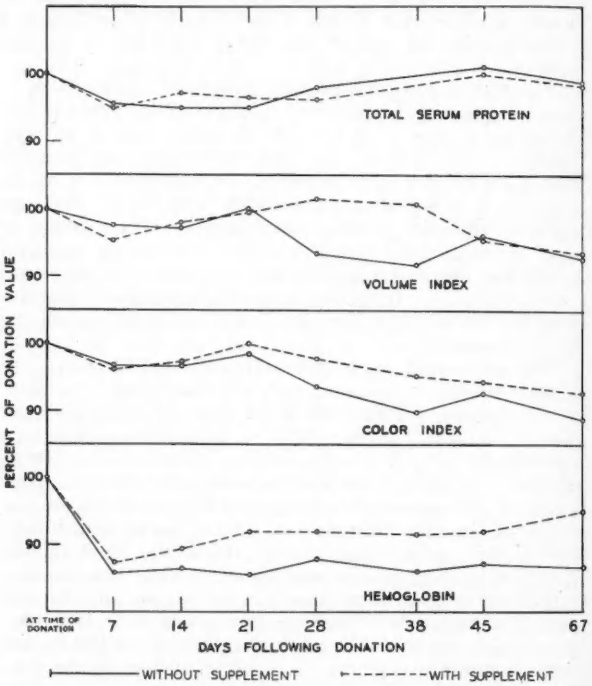

FIG. 1. *Comparison of blood values for subjects with and without a supplement of additional meat or milk following the withdrawal of 500 ml. blood*

contained more hemoglobin than did cells of the same size produced in the subjects when on the lower protein intake.

The statistical significance of the figures for hemoglobin content of the subjects' blood warrants special consideration (Table 3). Beginning with the values on the fourteenth day following donation, the difference in hemoglobin regeneration on the two levels of protein intake is statistically significant, the greater regeneration occurring on the 75 gm. protein intake.

The increased hemoglobin regeneration that occurred when the subjects were receiving the protein supplement is further emphasized when recovery is calculated in terms of the percentage of hemoglobin lost by withdrawal of 500 ml. blood, rather than the percentage of that in the total blood. For this it was necessary to calculate the blood volume and to assume that it had been restored to normal within 7 days after the donation. In Table 4 are shown the actual and calculated losses and the percentage replacement. When the subjects were receiving 75 gm.

protein daily, in 14 days they had replaced 13.2 per cent of the amount lost as compared with 6.1 per cent when their daily intake was 50 gm. Except for a sharp temporary rise at the end of 28 days the replacement of hemoglobin did not exceed 18.2 per cent as long as the subjects were on the basal diet or within 3 weeks after they had returned to their self-chosen ones, whereas when they were on the supplemented diet, regeneration amounted to 38.2 per cent and increased to 44.1 per cent after 3 weeks on the self-chosen diets.

determination was made between the twenty-eighth and forty-fifth day.

The only measurement which consistently reflected any difference between the subjects who were receiving additional meat, and those who were receiving additional milk and cheese, was that of serum protein (Table 5); although the differences are not statistically significant, the group that received additional meat had slightly higher percentages of their donation values (and after the fourteenth day a slightly higher absolute value) at each

TABLE 2

Comparison of blood values for subjects with and without a supplement of additional meat or milk following withdrawal of 500 ml. blood

TEST	NUMBER OF SUBJECTS	DONATION VALUE	DAYS FOLLOWING DONATION						
			7	14	21	28	38	45	67
		gm./100 ml. blood	*percentage of donation value*						
Hemoglobin									
With additional meat or milk	11	13.1	87.7	89.6	92.0	92.0	91.7	92.0	95.0
On basal diet	17	12.6	86.0	86.9	86.3	88.9	86.8	88.1	87.7
		(million /cmm.)							
Red Cell									
With additional meat or milk	11	4.541	91.2	92.3	92.0	94.0	96.4	97.6	102.9
On basal diet	17	4.509	89.0	89.6	87.6	95.0	96.6	94.9	98.7
Color Index									
With additional meat or milk	11	100	96.2	97.1	100.0	97.9	95.1	94.3	92.3
On basal diet	17	100	96.6	97.0	98.5	93.6	89.9	92.8	88.9
Volume Index									
With additional meat or milk	11	100	95.3	98.0	99.8	101.7	100.9	95.2	93.2
On basal diet	17	100	97.8	97.2	100.1	93.2	91.8	96.1	92.9
		gm./100 ml.							
Serum Protein									
With additional meat or milk	11	7.08	95.0	97.1	96.7	96.3		100.0	98.3
On basal diet	17	7.29	95.6	95.1	95.1	98.1		101.1	98.6

TABLE 3

Statistical constants for hemoglobin

TIME	WITH SUPPLEMENT	WITHOUT SUPPLEMENT	WITH SUPPLEMENT		WITHOUT SUPPLEMENT		Difference	
	Actual		Percentage of donation value					
	gm./100 ml. blood		*Mean*	*P.E.*	*Mean*	*P.E.*	*Diff.*	*P.E.*
At time of donation:	13.10	12.60	100.0		100.0			
Days following donation:								
7	11.49	10.83	87.7	.776	86.0	.725	1.7	1.062
14	11.74	10.89	89.6	.604	86.4	.473	3.2	.767
21	12.05	10.82	92.0	.677	85.9	.688	6.1	.965
28	12.05	11.10	92.0	.386	88.1	.675	3.9	.777
38	12.01	10.89	91.7	.787	86.4	.795	5.3	1.119
45	12.05	11.00	92.0	.684	87.3	.664	4.7	.953
67	12.45	10.95	95.0	.898	86.9	1.030	8.1	1.366
88	12.60*	—	96.2	.872	—		—	

* This is same figure as appears at the top of the next column.

TABLE 4

Replacement of hemoglobin lost by the withdrawal of 500 ml. blood

DESCRIPTION	WITH SUPPLEMENT	WITHOUT SUPPLEMENT
	gm.	*gm.*
Actual loss calculated on basis of hemoglobin content and volume withdrawn.	65.0	63.0
Loss calculated on basis of difference in hemoglobin content at time of withdrawal and 7 days later, assuming total blood volume to be 8% of body weight.	68.0	66.0
	%	%
Replacement of amount lost (percentage of calculated loss just above).		
Days following donation:		
14	13.2	6.1
21	38.2	6.1
28	38.2	25.7
38	32.3	6.1
45	38.2	18.2
67	44.1	12.1

The level of protein intake following the blood donation did not affect the concentration of total serum protein, nonprotein nitrogen, or the albumin:globulin ratio of the blood. (Figures for the nonprotein nitrogen and the albumin:globulin ratio are not reported because they constitute nothing but repetitions of normal values.) Seven days after the donation the serum protein concentration was 95 to 96 per cent of the donation value and had returned to 100 per cent by the forty-fifth day following donation and may have done so earlier, although no test date, than did the group that received additional milk and cheese. Values for both supplement groups dropped slightly when the subjects returned to self-chosen diets.

The better general performance in blood regeneration of the subjects when on the higher protein intake as compared with the lower is probably not so significant as the fact that even on the liberal protein intake of 75 gm. daily, together with an adequate supply of other nutritional essentials, these healthy young women did not completely replace within 45 days all of the hemoglobin lost by the

withdrawal of 500 ml.—a routine blood donation. When they returned to self-chosen diets for 6 weeks the hemoglobin values increased from 92 to 95 per cent of the donation value by the end of the first 3 weeks, then remained almost stationary, and were 96 per cent at the end of 6 weeks. When the subjects had not had the additional protein for 45 days following the donation, the self-chosen diets brought about no increase by the end of 3 weeks and it is unlikely that an increase would have occurred at the end of 6 weeks, although the end of the semester interfered with making actual determinations.

The general physical and mental condition of the subjects was excellent throughout and no objective evidence was available to indicate that they felt or acted any differently on the two diets.

TABLE 5

Comparison of total serum protein content of the blood of subjects receiving different supplements

SUPPLEMENT	DONATION VALUE	DAYS FOLLOWING DONATION					
		7	14	21	28	45	67
	gm./100 ml. blood	*percentage of donation value*					
Additional meat...	6.95	96.6	98.7	98.7	101.5	102.5	100.7
Additional milk and cheese.....	7.23	93.2	94.7	93.7	91.2	97.1	95.4

DISCUSSION

Recovery from a blood donation involves replacement of blood volume, plasma protein, formed elements, and hemoglobin—usually in the order named.

Because blood volume determinations were not made, the figures presented tell only the composition of the blood at intervals following the donation and not the composition of a known quantity of blood. From discussion in the literature (13) it is reasonable to assume, however, that the original blood volume is completely restored within 24 to 48 hr. following the withdrawal of no more than the 500 ml. donated by subjects of this study.

The withdrawal of 500 ml. blood meant that each subject lost between 90 and 95 gm. protein and 220 to 236 mg. iron from her body. Replacement of these amounts had to come from the dietary intake, but in the meantime new blood could be formed promptly at the expense of the body reserves and the reserves then replenished if dietary supply permitted. The protein content of the serum was returned to normal rather promptly at both levels of protein intake, indicating a mobilization of protein reserves into circulating plasma. At the end of 7 days following the donation, the blood protein level had returned to within 95 per cent of the concentration at the time of the donation. In the absence of nitrogen metabolism studies of the subjects, no finding can be presented regarding the replacement of these reserves, but there can be little doubt that when the subjects received 75 gm. protein daily they stored more protein than when they received only 50 gm. daily.

The subjects who received the additional protein from meat showed a slightly greater recovery of serum protein than did those who received their additional protein from milk and cheese; the difference, however, may not be significant. Madden and Whipple (14) found that beef serum proteins were superior to other proteins for plasma protein regeneration in adult dogs following plasmapheresis.

The replacement of the iron in the blood as measured by hemoglobin formation did not proceed as well as that of serum protein. Considering the adequacy and regularity of the dietary regimen, there was reason to expect that the iron in the diet, both basal and supplemented, would have been well used. On the basal diet 8 mg. was furnished daily and Leverton (8) has presented evidence that in these subjects an intake of about 4.5 mg. would have provided for maintenance; this would mean that 3.5 mg. would then be available for new hemoglobin formation. It is likely that the body stores yielded some iron, but even though they did not, the amount of iron needed to form the hemoglobin that had been lost could have been replaced by means of iron in the diet in 63 days. Table 4 shows that at 67 days only 12.1 per cent of the hemoglobin lost, and therefore probably the iron, had been replaced. On the supplemented diet there was 6.1 mg. iron above the maintenance requirement available and replacement could have been complete in 39 days. But after 38 days only 38 per cent of the iron and hemoglobin lost had been replaced. This suggests that the absorption or utilization of the dietary iron may have been one factor in limiting hemoglobin regeneration.

The small amount of iron that appeared as new hemoglobin could be explained in part if the amount of iron absorbed above that required for maintenance had to be shared equally with body stores, serum iron, and hemoglobin.

Experimental work with dogs by Robscheit-Robbins *et al.* (15) has led to the conclusion that, given a real need for both hemoglobin and plasma, the protein reserves will be used first for regenerating hemoglobin with the result that hemoglobin will be produced in greater abundance than will plasma. This was not the case in the present study, perhaps because the depletion of both hemoglobin and plasma protein was not extreme enough to demonstrate such preferential action.

The color index changed little during the first 3 weeks at either level of protein intake, then decreased as hemoglobin regeneration lagged behind cell formation. The size of cells remained much the same as before donation during the first 3 weeks, then decreased slightly as hemoglobin formation lagged.

There is no doubt that the protein intake of 75 gm. produced better hemoglobin regeneration than did the lower intake of 50 gm., even though both diets contained adequate amounts of the common nutritive essentials. The great similarity in response among the subjects on the two supplements—meat, and milk and cheese—precludes attributing the superiority of the 75 gm. protein as compared with the 50 gm. intake to increased amounts of thiamin, riboflavin, calcium, or iron. If, for example, the additional iron in the supplemented diet had been solely responsible for the better hemoglobin regeneration, then the 11.4 mg. iron in the basal diet plus the additional meat would have resulted in higher hemoglobin values than the 9.8 mg. iron in the basal diet plus the additional milk and cheese (Table 1). This definitely was not the case. On the other hand, the subjects whose diets contained additional milk received more riboflavin and calcium, but their hemoglobin formation did not surpass that of the subjects receiving additional meat. Neither can the poorer regeneration on the lower protein intake be attributed to the fact that it followed the second donation given by the subjects, the first one having been given 16 weeks earlier. Three of the girls who gave 2 donations and 6 who gave only 1 donation had the 50 gm. protein intake following their first donation and responded in the same manner as those who had 50 gm. protein following their second donation.

What factors limited the regeneration, even on the higher protein intake, to 92 per cent of the donation value by the end of 45 days and 95 per cent by the end of 67 and 88 days

cannot be established from the results of this study. Because hemoglobin formation is often stimulated by iron therapy it is likely that added iron, as an iron salt, in these diets would have resulted in a more rapid replacement of hemoglobin. The effect of such therapy, however, has been shown to be transitory (16). Moreover, Hahn and Whipple (4) have demonstrated that a low-protein intake limits the production of hemoglobin in the standard anemic dog, even when additional iron is given by mouth or vein. They suggest that globin production may be the limiting factor in the dogs on the low-protein level.

The findings presented indicate that for a woman there is real advantage in consuming a diet that contains at least 75 gm. protein daily, as compared with one which contains 50 gm., when hemoglobin needs to be formed. The daily protein intake of women, however, is usually far less than 75 gm. The self-chosen diets of 100 college women students who were studied for one week contained an average of 59 gm. protein daily (17), while in a cooperative dormitory where the students had supervision in planning their meals the daily protein intake was only 60 gm. (18). When the students calculate their dietaries in dietetics classes each semester, several intakes below 50 gm. protein a day are noted. Critical observation of the food habits of almost any group of women reveals their practice of eating small amounts of the foods rich in protein and when queried regarding the habit they will invariably explain that they have always thought that "too much protein isn't good for you." Unfortunately, they have interpreted "too much" as any amount above an absolute minimum.

Even though a daily protein intake as low as 50 gm. may not be noted frequently, when checking total intakes for a given day, it must be remembered that in the usual routine of living almost every week is likely to include at least one breakfast on the run, one lunch omitted, and even a dinner skipped in the interest of haste or hipline. It does not take many such interruptions in the dietary supply line each week to reduce the average daily intake of nutritive essentials far below the one in the basal diet of this study.

It is of definite importance to the average woman blood donor, therefore, to realize that her usual self-chosen diet is not likely to provide building material in sufficient quantity to ensure the complete replacement within 10 weeks of a 500 ml. blood donation.

No period of time has been set as a standard for complete recovery from a blood donation. With volunteer donors an intervening period of 8 to 10 weeks is required between donations, whereas with professional donors the time may be much less. Usually hemoglobin value at the time of donation, irrespective of previous values, is the basis for acceptance or rejection of the donor's contribution to the blood bank. It would be desirable to have the blood constituents return to normal concentration even more promptly than was observed in this study in which the diet was better than that of most women donors. In studies now in progress 100 gm. protein is included in the diet of blood donors daily, with and without additional iron from a medicinal source, and also diets with additional iron and no additional protein, as well as diets fortified for a time prior to the donation similar in principle to those used in preoperative feeding.

Without waiting for further quantitative information, however, results herein reported justify not only suggesting but *urging* the woman who is a blood donor or who has hypochromic anemia and needs to build hemoglobin, to include in her diet additional quantities of meat and milk or other foods rich in animal protein and iron.

SUMMARY AND CONCLUSIONS

Blood regeneration was studied in 17 healthy college women students who served as blood donors and subjects on a controlled dietary regimen. Following the first donation they received a diet that furnished approximately 75 gm. protein daily and following the second donation 16 weeks later a diet that furnished 50 gm. protein daily.

Regeneration, especially of hemoglobin, was significantly better on the higher protein intake but a return to the blood values determined at the time of donation was not complete (in any case except serum protein) even at the end of 10 weeks.

The need for the woman donor to select a diet that will furnish at least 75 gm. protein daily is stressed.

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Collectivism vs. Americanism. We general practitioners, by virtue of our training, diagnostic services and analytical inclinations, are well equipped to help lead this country out of its economic and social maze. To do this best we must enter the lists first as citizens, and as doctors only when we can aid in interpretation of the origin and the nature of the deteriorating social processes which are now plaguing this earth. We must come to the defense of those principles of government on which our fathers founded this nation. No other principles of government or system of medicine have ever succeeded so well. These principles, in recent years, have been challenged by those who would seek to give security against fear, want and sickness by taking from those who have and giving to those who have not. Those active in this movement fail to realize that these goals, which sound so attractive when they are defined by glittering generalities, can be obtained only through the redemption of man and never by the redistribution of what little real wealth is to be left in our land. This strange ideology, entirely foreign to our country, is infiltrating itself into the muddled thinking of our people. We must recognize that, however attractive this sounds, social security demands that each citizen give up his individuality, his integrity, his intelligence and his independence in order that he may share in the redistribution of existing wealth. As biologists, we physicians know and must not hesitate to point out that nature has tried this pattern over and over again and has never produced anything more progressive than a colony of social insects—a heap of ants or a hive of bees. In terms of social progress, this biologic pathway has a blind ending. As physicians we must make our own patients see that social progress can come only as we emphasize the dignity of the common man, so that through variation in behavior this independence may here play its proper role in evolution.—*Bowman, J. C.: The Role of the General Practitioner, J.A.M.A. 126: 331, 1944.*

THE NUTRITIVE VALUE OF CANNED FOODS:

VI. Effect of Large-Scale Preparation For Serving on the Ascorbic Acid, Thiamin, and Riboflavin Content of Commercially-Canned Vegetables[1]

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This study was planned to determine the effect of large-scale preparation of canned vegetables, (comparable to that in Army mess kitchens) on their water-soluble vitamin contents. The method of preparation used, namely, boiling for 30 min. in a closed kettle, was one judged by Mary I. Barber, Office of the Quartermaster General, War Department (1), to be a "typical" method of preparation in Army posts. Moreover, since in most company mess kitchens the products are served with a slitted spoon, thus draining off most of the liquid, the retentions in this type of serving were also studied. And finally, since in many mess kitchens products are kept hot from ½ to 1½ hr. after the preparation, the effect of holding over steam for the longest of these periods was also investigated.

EXPERIMENTAL METHODS

Preparation Procedures. The method of separation of the solid and liquid portions from the 6 cans of each lot of vegetables used in this study, as well as the sampling of these portions for analysis before heating, has been described in a previous publication on the distribution of the vitamins between the solid and liquid portions of the cans (2). The weights of the total solids and liquids reconstituted for large-scale cooking, amounting to the contents of somewhat more than 5 No. 10 cans (except baked beans, for which product the contents of about 2¾ No. 10 cans were used) are given in Table 1. Most other pertinent details regarding the cooking procedures are also included in this table, but a few comments should be added here. In heating all products except baked beans, a 10-gal. kettle was given all the heat obtainable from a 6-in. gas burner until the contents came to a full boil, and boiling was continued 30 min. over a lowered flame. Baked beans were heated for 1½ hr. in a gas oven at 400°F. in a shallow iron pan 12 × 18 in.

TABLE 1

Preparation procedure—large-scale

Vegetable	Exp. no.	Weight before heating		Total time* heated	Weight after heating		Sample held over steam†			
							Initial weights		Proportion of liquid served‡	Final weight after 1½ hr. over steam
		Solid	Liquid		Solid	Liquid	Solid	Liquid		
		gm.	gm.	min.	gm.	gm.	gm.	gm.	%	gm.
Asparagus, all green	1	9331	6742	68	8228	6860	804	308	46	983
	2	10927	5565	66	9124	6440	892	258	41	1058
Beans, baked, New England style	1	9453		90	7965		1362		—	1304
Beans, baked with tomato sauce	2	8976		90	7613		986		—	936
Beans, green, cut I	1	9996	6206	74	9029	6126	845	80	14	862
II	2	9780	6510	69	9080	6138	902	79	13	864
Beans, Lima, green	1	12463	5029	75	12374	4227	1025	51	14.5	1000
	2	12845	5349	77	11877	4402	1118	54	13	1103
Carrots	1	11884	4732	70	11059	4615	1011	114	27	1031
	2	12144	4493	75	11165	4385	1023	116	29	1030
Corn, yellow, whole kernel	1	10720	5917	80	10056	5641	893	105	21	933
	2	10700	5990	75	10040	5700	865	94	19	897
Spinach	1	7286	7810	72	6612	7495	975	425	38.5	1311
	2	8281	7021	71	7893	6734	908	340	44	1141
Tomatoes	1	18731		81	18041		1234		—	1093
	2	18660		87	18039		1251		—	1126

* Time to bring to full boil + 30 min. slow boiling.
† Approximately 10 to 12 servings, taken with a slitted spoon from the total cooked product.
‡ Stated in percentage of that amount of liquid which belonged to the portion of the boiled solid served.

Sampling for Analyses. To have a basis for calculating the retention of the original vitamin contents, no matter what combination of boiled solid and liquid would be served together, it was necessary to have not only the weight of the whole large boiled lot, but also the separated solid and liquid weights and separate analyses of these. However, before the whole cooked product was separated and weighed, a 900 to 1400-gm. portion, 10 to 12 servings (Table 1), was ladeled out with a slitted spoon. This portion was then separated on a

The vitamins determined were ascorbic acid, thiamin, and riboflavin. Analytical results for duplicate large-scale preparation experiments on 8 vegetables are reported. The duplicate experiments were carried through on two identical packs of asparagus, Lima beans, carrots, yellow corn, and spinach; whereas for green beans and tomatoes, the variations in packs used in duplicate experiments were limited to variation in the period of the packing season, since the products were from the same plant. For baked beans, two different types of products were prepared.

[1] Received for publication June 2, 1944. This study was supported by the National Canners Association and Can Manufacturers' Institute Nutrition Program.

12-in. monel metal standard drained solids sieve in order to determine what proportion of liquid was taken up in the serving. Although Miss Barber stated that mess officers estimated that about one fifth of the liquid is thus served with vegetables, we found (Table 1) that the amount varied between 13 and 46 per cent of the proportional amount of liquid to solid present in the whole boiled lot. Such large variation did not occur, however, in repeated serving of one product, but only between different types of products. For asparagus and spinach, the Army mess kitchen method of holding the whole cooked lot, with all the liquid, on the back of a stove.

After 1½ hr., the loss in weight of the lot was determined following rapid cooling to 20°C. by immersion in an ice bath, and two 200-gm. samples, one for ascorbic acid and one for thiamin and riboflavin determinations, were removed to tared Waring Blendor cups. To these were added measured amounts of 3 per cent metaphosphoric acid and 0.1 N sulfuric acid, respectively, and after blending for 1 min. the samplings were continued by

TABLE 2

*Ascorbic acid concentrations and percentage retentions in large-scale preparation and serving of canned vegetables**

VEGETABLE	EXP. NO.	CONCENTRATIONS					PERCENTAGE RETENTIONS					
		Initial		Final			Boiled 30 min., tested immediately. Based on original total content				Served with slitted spoon; held over steam 1½ hr.†	
				Boiled 30 min., tested immediately		Served with slitted spoon; held over steam 1½ hr.†			In total product			
		In solid	In liquid	In solid	In liquid		In solid	In liquid	If all boiled liquid served	As served with slitted spoon†	Based on content before holding	Based on original total content
		mg./100 gm.	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*	%	%	%	%	%	%
Asparagus, all green	1	11.7	12.3	12.2	12.7	12.9	52	45	97	73	92	67
	2	14.4	13.3	13.7	14.0	14.8	54	39	93	70	99	69
Beans, baked, New England style	1	0		0		0	—	—	—	—	—	—
Beans, baked with tomato sauce	2	2.2		Trace‡		Trace‡	—	—	<20‡	—	Not determinable	(Whole) <20†
Beans, green, cut I	1	2.1	2.1	1.0§	1.9	0.8§	27	33	60	32	29	9
II	2	2.6	2.6	1.2§	1.4	0.8	26	20	46	28	56	16
Beans, Lima, green	1	8.1	12.8	4.1	9.2	1.4	31	23	54	34	30	10
	2	6.0	12.1	2.7	4.5	1.0	22	14	36	24	33	8
Carrots¶	1	1.1	1.3	0.36	0.67	0.37	21	17	38	26	87	23
	2	1.8	1.9	0.81	0.77	0.50	30	11	41	33	56	19
Corn, yellow, whole kernel	1	2.4	4.7	Trace‖	3.1	Trace‖	<7‖	33	33+	<7	Not determinable	<7‖
	2	1.8	4.0	Trace	2.3	Trace	<8	31	31+	<6		<8
Spinach	1	14.0	17.3	10.4	14.5	10.7	29	46	75	47	86	40
	2	18.4	20.6	15.3	16.5	14.8	41	37	78	57	87	50
Tomatoes I	1	18.1		18.6		19.0	—	—	99	—	(Whole) 91	(Whole) 90
II	2	16.7		16.4		16.8	—	—	95	—	92	87

* Six No. 10 cans were mixed in all cases except for both varieties of baked beans in which 3 No. 10 cans were mixed, and tomatoes in which 24 No. 2½ cans were mixed.

† For proportion of solid and liquid in product held over steam see Table 1.

‡ Lower than experimental error, which was about 20% of original low value.

§ Duplicates varied by 15 to 20%, therefore average values can be relatively in error by ±10%.

¶ In spite of low values in carrots, only one pair of duplicate determinations were as much as 12% apart. Nevertheless, it is possible that in relation to each other the average values here tabulated could be in error by ±10%.

‖ Lower than experimental error, which was about 14 to 18% of original low values of the solids, or about 7 to 8% of original value of the whole composites.

the proportion of liquid spooned up was large; for carrots and corn, intermediate; for green beans and Lima beans, very small. The liquid and drained solids were then recombined in a large tinned bowl and held uncovered over the water, which was kept just below the boiling point. The bowl rested in the hot-water pan so that it was surrounded by steam, 3 in. in depth, which was at least as high as the level of the vegetable. This method, therefore, more nearly simulated institution steam-table holding in the presence of a small amount of liquid than transferring appropriate weighed aliquots of the blends by means of pipettes with wide ends to volumetric flasks for buffering in the case of ascorbic acid determinations, and to 250-ml. centrifuge bottles for hot extraction with 0.1 N sulfuric acid in the case of thiamin and riboflavin determinations.

After removing the sample to be held over steam, the rest of the original cooked material was separated as quickly as possible by draining (on the sieve) in 3 to 5 portions for 1 min. each, then weighed. The sums of

these weights, plus those for the sample removed for holding, gave the totals for the whole cooked batch. The solid was appropriately sampled and blended as described above for the product held over steam. Weighed portions of the total liquid were also transferred to the appropriate acids, 45 to 50-gm. samples of liquid being taken for ascorbic acid and 20-gm. samples for thiamin and riboflavin determinations.

Methods of Analysis. Limitations as to the minimum determinable values for ascorbic acid, as well as some modifications in the combined method for thiamin and riboflavin and the results on standard recovery experiments with the latter, have been described in our earlier paper (2). Therefore only mention of the methods which were essentially followed will be repeated here.

The Morrell (3) modification of the Bessey (4) photo-electric method was used for all ascorbic acid determinations reported in this paper.

For thiamin and riboflavin, the double adsorption method of Conner and Straub (5) with the Hennessy (6) procedure for the base-exchange and the thiochrome reaction, and a modified Conner and Straub (5) procedure for the riboflavin fluorescence measurement were used.

DISCUSSION OF RESULTS

The individual values on solids and liquids before heating (Tables 2–4), which are averages of duplicate determinations, are the same as those making up the complete averages previously reported (2), and the variations between these for separate 6-can lots of identical code numbers are summarized there.

At least two thirds of the duplicate determinations of any of the three vitamins made on two aliquots of one blend agreed to within 5 per cent or better, and practically all of the rest were within 5 to 10 per cent agreement

TABLE 3

*Thiamin concentrations and percentage retentions in large-scale preparation and serving of canned vegetables**

VEGETABLE	EXP. NO.	CONCENTRATIONS					PERCENTAGE RETENTIONS					
		Initial		Final			Boiled 30 min., tested immediately Based on original total content				Served with slitted spoon; held over steam 1½ hr.†	
				Boiled 30 min., tested immediately		Served with slitted spoon; held over steam 1½ hr.†			In total product			
		In solid	In liquid	In solid	In liquid		In solid	In liquid	If all boiled liquid served	As served with slitted spoon†	Based on content before holding	Based on original total content
		mg./100 gm.	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*	%	%	%	%	%	%
Asparagus, all green	1	0.079	0.079	0.069	0.079	0.080	45	42	87	65	98	63
	2	0.075	0.075	0.078	0.071	0.083	63	40	103	79	100	79
Beans, baked, New England style	1	0.145		0.156		0.156	—	—	91	—	(Whole) 96	(Whole) 87
Beans, baked with tomato sauce	2	0.045		0.047		0.047	—	—	88	—	96	84
Beans, green, cut I	1	0.030	0.022	0.028	0.025	0.030	58	35	93	62	98	61
II	2	0.026	0.021	0.023	0.024	0.025	53	38	91	58	97	56
Beans, Lima, green	1	0.019	0.025	0.022	0.020	0.024	76	24	100	79	102	80
	2	0.021	0.025	0.022	0.023	0.022	63	25	88	66	94	62
Carrots	1	0.021	0.021	0.020	0.023	0.022	64	30	94	71	97	69
	2	0.022	0.022	0.022	0.022	0.023	68	27	95	76	95	72
Corn, yellow, whole kernel‡	1	0.011	0.011	0.009	0.009	0.009	52	27	79‡	58	93	54
	2	0.012	0.013	0.010	0.010	0.011	50	27	77‡	55	95	52
Spinach	1	0.022	0.022	0.020	0.023	0.022	41	51	92	60	96	58
	2	0.025	0.022	0.024	0.025	0.027	52	47	99	73	102	75
Tomatoes I	1	0.071		0.052		0.056	—	—	71§	—	(Whole) 96	(Whole) 67
II	2	0.063		0.061		0.066	—	—	94	—	98	91

* *See* first footnote to Table 2.

† For proportion of solid and liquid in product held over steam, *see* Table 1.

‡ In spite of low values in yellow corn, no pair of duplicate determinations were more than 10% apart. Nevertheless it is possible that, in relation to each other, even the average values here tabulated can be in error by ±10%; therefore the percentage retention figures could have a combination of four such errors easily amounting to 25%.

§ Errors in the two average values involved here should not add up to much more than 10%; therefore this loss on boiling ought to be significant.

Among the very low values for each of the vitamins, there were two for which duplicates varied from each other by 10 to 14 per cent. Also, in the footnotes to Tables 2 and 4, a 15 to 20 per cent variation is pointed out for three low ascorbic acid values and one riboflavin. In general it is felt that the average values given in Tables 2–4 are accurate to at least ±5 per cent. Footnotes to these tables indicate where the errors could be greater.

Since these experimental errors enter into percentage retention calculations four times in the case of all large-scale preparations except tomatoes and baked

beans (in the latter products liquids were not separately analyzed, hence retention figures are based on only two values), it is obvious that ±10 per cent variations in retentions, in general, cannot be considered as significant. Moreover, very occasionally errors could add up to 20 per cent. Therefore the retention results (Tables 2–4) should be interpreted in the light of these limitations.

CONCLUSIONS

From the results shown in Tables 2–4, it can be concluded that the retention of ascorbic acid is much more variable than that of the other two vitamins. In asparagus and tomatoes, there was no definite destruction of ascorbic acid after boiling for 30 min. and even after the product had been kept hot 1½ hr. longer. In asparagus, the final retention of ascorbic acid in the served product was only decreased in proportion to the amount of the liquid discarded, since this contained at least two fifths of the vitamin. Such results indicate the presence of protective antioxidant materials in these two vegetables.

There was less destruction of ascorbic acid in spinach than in beans, carrots, or corn, the retention being 75 to 80 per cent after 30 min. boiling, and 85 per cent of the remainder after holding hot for the longer period.

As for the rest of the vegetables, the retentions ranged downward from about 60 to 35 per cent when no liquid was discarded, being, on the whole, somewhat less for these large-scale products than for small-scale ones to be reported in a subsequent paper in this JOURNAL. In addition, all showed further and decided but variable losses upon holding over steam. When the liquid was discarded, all products, except asparagus, retained only between 7 and 41 per cent of the original ascorbic acid. With most of the liquid discarded by serving with a slitted spoon, the retentions were only slightly better, ranging in the served portions from 7 per cent for corn to 57 per cent for spinach.

The percentage retention figures for thiamin and riboflavin (Tables 3 and 4) show that there was no definite loss in either of these vitamins if all the liquid was retained, even though the whole product was boiled for 30 min. and a served portion of it then kept hot for another 1½ hr. It is difficult to explain one apparent

TABLE 4

*Riboflavin concentrations and percentage retentions in large-scale preparation and serving of canned vegetables**

VEGETABLE	EXP. NO.	CONCENTRATIONS					PERCENTAGE RETENTIONS					
		Initial		Final			Boiled 30 min., tested immediately. Based on original total content				Served with slitted spoon; held over steam 1½ hr.†	
				Boiled 30 min., tested immediately		Served with slitted spoon; held over steam 1½ hr.†			In total product			
		In solid	In liquid	In solid	In liquid		In solid	In liquid	If all boiled liquid served	As served with slitted spoon†	Based on content before holding	Based on original total content
		mg./100 gm.	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*	%	%	%	%	%	%
Asparagus, all green	1	0.104	0.082	0.102	0.105	0.100	55	47	102	77	86	66
	2	0.124	0.090	0.121	0.117	0.127	59	40	99	75	98	73
Beans, baked, New England style‡	1	0.017		0.015		0.015	—	—	74‡	—	(Whole) 96‡	(Whole) 71‡
Beans, baked with tomato sauce‡	2	0.026		0.030		0.026	—	—	96‡	—	82‡	79‡
Beans, green cut I	1	0.032	0.017	0.031	0.027	0.030	66	39	105	71	92	66
II	2	0.047	0.029	0.045	0.040	0.046	64	38	102	69	90	62
Beans, Lima, green	1	0.053	0.046	0.052	0.048	0.052	72	23	95	76	93	70
	2	0.057	0.042	0.051	0.049	0.051	63	23	86	67	94	63
Carrots‡	1	0.027	0.021	0.023	0.021	0.028	63	23	86‡	69	110‡	76
	2	0.021	0.015	0.023	0.021	0.025	81	29	110‡	90	98‡	88
Corn, yellow, whole kernel	1	0.060	0.044	0.057	0.059	0.058	63	37	100	71	95	68
	2	0.063	0.043	0.057	0.056	0.061	61	34	95	68	100	68
Spinach	1	0.128	0.091	0.116	0.109	0.117	46	50	96	66	96	63
	2	0.136	0.096	0.121	0.112	0.125	53	42	95	72	97	69
Tomatoes‡ I	1	0.014		0.017		0.012	—	—	114‡	—	(Whole) 67‡	(Whole) 76‡
II	2	0.0060		0.0057		0.0054	—	—	92‡	—	85‡	78‡

* *See* first footnote to Table 2.

† For proportion of solid and liquid in product held over steam, *see* Table 1.

‡ In spite of the low values in baked beans, carrots, and tomatoes, no pair of duplicate determinations were more than 10% apart, except for one in tomatoes II where the content is so low as to be almost undeterminable, and for which the duplicates in the boiled product were 18% apart. Nevertheless, in all of these it is possible that in relation to each other even the average values here tabulated can be in error by ±10%, and therefore the percentage retention figures for baked beans and tomatoes could have a combination of errors from two values, up to 20%, and for carrots, from four values, even higher.

exception in the large-scale preparation of one lot of tomatoes where a loss of 30 per cent of the thiamin during the boiling is about 20 per cent greater than experimental error. It would not seem that it was due to a characteristic of this particular lot of tomatoes, since the loss did not progress while holding over steam.

When the cooked liquids are not all retained, the losses of the vitamins are directly related to their concentrations in these liquids and to the proportions of the liquids discarded. Thus, for portions served, in which some of the liquid was retained, the thiamin retentions ranged from about 60 to 80 per cent of the original totals; those for riboflavin, from about 66 to 77 per cent.

SUMMARY

Large-scale preparations for serving, such as had been described as typical for Army mess kitchens, were carried out in duplicate on the following 8 canned vegetables: asparagus, baked beans, green beans, Lima beans, carrots, yellow corn, spinach, and tomatoes, and the retentions of ascorbic acid, thiamin, and riboflavin were determined. The effect on the vitamins of holding the cooked products hot for 1½ hr. was also investigated.

The precision of the vitamin assays and its relation to retention figures are discussed.

It was concluded that when all liquid is retained, ascorbic acid retention with heating is variable. It was best for tomatoes, asparagus, and spinach, ranging from 100 per cent in the first two to around 80 per cent for spinach. Holding these vegetables hot also caused little change in their ascorbic acid value, the change being nil for tomatoes and asparagus, and about 15 per cent for spinach. Other vegetables retained from 60 down to 35 per cent of their ascorbic acid during the long boiling employed in this type of preparation and showed additional variable but pronounced losses during holding over steam.

If all the liquid is retained, retention of thiamin and riboflavin is practically complete for all products both during long boiling and holding over steam.

When some liquid is discarded, as in serving with a slitted spoon, the loss of all of the vitamins is considerable and is directly related to their concentrations in the boiled liquid and to the proportion of liquid discarded.

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Vitamins in Medical Treatment

The use of specific vitamins or vitamin mixtures in medical treatment should be based, it seems to me, on the best available information on what is considered to be the body requirements. It is impossible to give specific details of treatment, for like all other therapy it should be planned for each specific case. Unless there are conditions which prevent the normal ingestion or assimilation of food, an early and important therapeutic procedure is to make sure the person consumes a really good diet, so that he actually receives good nutrition. If the history, or clinical or laboratory findings suggest specific vitamin deficiencies, supplemental therapy, either orally or parenterally, as the situation suggests, is desirable. The following are useful ranges of specific vitamin dosages:

Vitamin A	Preventive Treatment —2000 to 5000 I.U. per day Therapeutic Treatment—10,000 to 30,000 I.U. per day
Ascorbic Acid	Preventive Treatment — 25 to 50 mg. per day Therapeutic Treatment—100 to 300 mg. per day
Thiamin	Preventive Treatment —1 to 3 mg. per day Therapeutic Treatment—3 to 10 mg. per day
Riboflavin	Preventive Treatment —1 to 3 mg. per day Therapeutic Treatment—3 to 10 mg. per day
Niacin	Preventive Treatment — 5 to 20 mg. per day Therapeutic Treatment—50 to 300 mg. per day; when using these amounts, niacinamide is preferable.

—*Stare, F. J.: Nutrition in Medicine, the Wesley M. Carpenter Lecture, presented at the 16th Graduate Fortnight of the New York Academy of Medicine, October 22, 1943.*

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Keeping Meat

In general, food scientists advise never washing or even wiping meat with a damp cloth until just before cooking. Remove meat from the market paper as soon as it reaches the kitchen, lay on a plate, cover lightly with waxed paper, and put in meat compartment of the refrigerator, just under the freezing unit. Do not cut or chop meat until just before using. Steaks, chops, and roasts generally keep best of all, so may be safely held 2 or 3 days in a refrigerator at 45°F. or colder. Cook ground meat within 24 hr. after purchasing, or freeze in freezing unit. Before freezing, add seasoning and form into cooking portions, then wrap tightly in waxed paper. The same rule holds for variety meats. Ham and other smoked meats, if mildly cured, will keep in the refrigerator as long as two weeks. To prevent mold they can be wrapped in clean cloth wrung out of vinegar, and then in waxed paper. Leftover cooked meat keeps best in a covered dish or wrapped in waxed paper.

Chicken and other poultry are the exception to the rule of not washing or wiping until just before using. Clean and wipe with a damp cloth before putting in the refrigerator. Leave bird whole until just before using. Freeze like other meat.—*Excerpts From Food and Home Notes, USDA, July 17, 1944.*

ASCORBIC ACID, THIAMIN, AND RIBOFLAVIN RETENTION IN FRESH SPINACH IN INSTITUTION FOOD SERVICE[1]

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THE purpose of this study was to determine the retention of ascorbic acid, thiamin, and riboflavin in fresh spinach as affected by certain institution food service procedures of cooking and serving. Procedures investigated included: 1. Boiling and steaming, with variations in the type of institution cooking equipment used, the amount of water, and the quantity of vegetable cooked at one time. 2. Holding the cooked spinach prior to serving.

Due to growing conditions it was necessary to carry out a considerable portion of the study with market-fresh spinach, although some of the studies were made with garden-fresh spinach.

REVIEW OF LITERATURE

Values for ascorbic acid, thiamin, and riboflavin content of spinach have been reported as follows: ascorbic acid, respectively (1–9), over 50, 50, 36.9 to 53.3, 32.1 to 118.1, 38 to 89, 123.9, 58.3 to 114.2, 19.8, and 90.4 mg. per 100 gm.; thiamin, respectively (8, 10–12), .304, .116, .108, and .107 mg. per 100 gm.; riboflavin, respectively (11–13), .436, .213, and .37 to .42 mg. per 100 gm.

EXPERIMENTAL PROCEDURE

History. The garden-fresh spinach (Longstanding Bloomsdale variety) was grown in the University gardens and used from September 30 to October 9; the market-fresh spinach (Virginia Blight Resistant and Bloomsdale varieties) was purchased from one wholesale dealer (from October 21 to November 19) and had been grown in the vicinity of Elmira, New York, on dry land, sandy loam soil and washed immediately upon harvesting, while that purchased November 21 to December 8 was grown in the vicinity of Rochester, New York. That used between December 15 to April 15 was shipped from Elsa, Texas, and may have been the Extra Dark Green, Bloomsdale, and Old Dominion varieties—most frequently grown in the lower Rio Grande Valley. Irrigation is commonly practiced in this area if the rainfall is not sufficient. The spinach was packed unwashed with a layer of crushed ice in the center of each bushel basket, shipped under refrigeration, and was in transit for at least 4 days. The spinach was delivered usually the day before it was cooked and stored in a refrigerator at 38°F. so that the layer of crushed ice was still intact when the spinach was unpacked.

Cooking and Holding Equipment. The following types of institution equipment were used:

(a) Boiling: 1. Steam-jacketed kettles: 5-gal., deep-type, nickel, diameter 13 in., depth 10½ in.; 25-gal., shallow-type, aluminum, diameter 28 in., depth 13 in.; and 40-gal., deep-type, aluminum, diameter 24½ in., depth 15½ in. 2. Aluminum stockpots on a closed-top gas range: 8½-gal., diameter 16 in., depth 10 in.; 16-gal., diameter 16½ in., depth 15½ in. (this pot was part of the U. S. Army field range equipment). 3. Aluminum stockpot (same 16-gal. pot as described in 2 above) in a U. S. Army field range.

(b) Steaming: Two-compartment, direct-connected steamer with synchronized thermostatic control; each compartment equipped with temperature-pressure gage; maximum pressure in compartments, 5 lb. A stainless-steel perforated steamer basket, 22½ x 8 x 6½ in., was used to hold the spinach.

(c) Holding: An electrically-heated, thermostatically-controlled, insulated and enclosed food service unit was used. Stainless-steel service pans, 9½ x 9½ x 3½ in., were used to hold the cooked spinach.

Cooking and Holding Methods. In all the boiling studies, the spinach was added to the salted boiling tap water (¼ c. table salt per gal. water), cooked uncovered until just tender, and turned with a stainless-steel, perforated skimmer 2 or 3 times during cooking by lifting it from the outside of the kettle toward the center. The amount of water used in each boiling procedure was sufficient to submerge the spinach when it began to boil and to prevent scorching around the sides of the steam-jacketed kettle or stockpot. Cooking with less water than this was impractical. The total cooking period was recorded in each case, as well as the actual boiling time, when the method employed was such as to reduce the temperature of the water below boiling when the spinach was added. The water did not stop boiling in the steam-jacketed kettles.

All draining was done in an aluminum colander, 15½ in. in diameter and 8½ in. deep. When using the steam-jacketed kettle, the water was removed through the draw-off faucet, the spinach transferred to the colander and drained. For all methods of cooking the periods of drainage were as follows: 5-lb. lots for 2½ min., 15-lb. lots for 5 min., and 30-lb. lots for 7½ min.

Five, 15, and 30-lb. lots of trimmed, washed, and drained spinach were used which yielded, respectively, 18 to 20, 45 to 50, and 95 to 100 (3-oz.) servings. In the holding studies, 650-gm. lots, equivalent to 7 to 8 (3-oz.) servings, of cooked spinach were used.

Each cooking and holding study was repeated at least 5 times except for those otherwise noted in the tables.

In boiling, the following equipment and methods were used:

(a) *A 5-gal., deep-type, steam-jacketed kettle:* Each 5-lb. lot was cooked uncovered in 2¾ qt. salted boiling water for 5 min.

(b) *A 25-gal., shallow-type kettle:* Each 15-lb. lot was boiled in 8 and 16 qt. water for 6 and 5 min., respectively.

(c) *A 40-gal., deep-type kettle:* Each 15-lb. lot was boiled in 32 qt. water for 4 min.; each 30-lb. lot, in 16 qt. water for 5 min.

(d) *An 8½-gal. stockpot on a closed-top gas range:* Each 5-lb. lot was cooked in 2¾ qt. salted boiling water; total cooking time 8 min., actual boiling time 5 min.

(e) *A 16-gal. stockpot (field range equipment) on a closed-top gas range:* Each 15-lb. lot was cooked in 2 qt. water for 17 min. and in 8 qt. water 13 min. Actual boiling time for each was 5 min.

(f) *A 16-gal. stockpot in a U. S. Army field range:* Each 15-lb. lot was cooked in 2 qt. salted boiling water for 10 to 14 min. Actual boiling time was 5 min. Difficulty was encountered in controlling the gas flame.

Steaming. Each 5-lb. lot was placed in a stainless-steel, non-perforated basket, steamed for 5 min., and sampled immediately. The steamer was preheated to 212°F. In order to reach the maximum pressure and temperature at the end of the short steaming period, the steamer was operated as free-venting for 2 min. to expel the air in the compartment rapidly. Averages of 218°F. and 2 to 3-lb. pressure were reached.

Holding. Three 650-gm. lots of drained, cooked spinach boiled in a 5-gal. steam-jacketed kettle were placed in a heated food service unit and held for 15, 30, and 120 min. with the control set at 150°F.

Sampling. The prepared, washed, and drained spinach was sampled on removal from the refrigerator to the kitchen and again just before cooking, approximately 5 hr. later. Samples of the cooked vegetable (about 200 gm. of the raw and 250 to 300 gm. of the cooked) were taken after drainage. All samples were then cut with sharp

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shears. Duplicate 10-gm. samples of the cut spinach were used for the ascorbic acid and 25-gm. samples for thiamin and riboflavin analyses. Duplicate 25-ml. samples of cooking water were used. The extracting acid was added to the samples and these were refrigerated until determinations were made. The ascorbic acid determinations were made the same day that the samples were taken; thiamin and riboflavin determinations were started and carried as far as the base exchange purification. In the combination thiamin and riboflavin determinations, the riboflavin analyses were made under controlled illumination.

Chemical Determinations. All samples were macerated in a Waring Blendor. The method of determining the ascorbic acid was that of Bessey and King (14) as modified by Mack and Tressler (15). Thiamin and riboflavin were determined by the Conner and Straub method (16) as modified for vegetables by Moyer and Tressler (17).

RESULTS AND SUMMARY

The vitamin content of the raw garden-fresh spinach ranged as follows: ascorbic acid, 45 to 76 mg.; thiamin, .10 to .13 mg.; riboflavin, .20 to .23 mg. per 100 mg. (Table 1). The vitamin content of the raw market-fresh spinach

TABLE 1

Ascorbic acid, thiamin, and riboflavin content of raw garden-fresh and market-fresh spinach according to season and area of growth

SOURCE AND SEASON	AREA OF GROWTH	ASCORBIC ACID	THIAMIN	RIBOFLAVIN
		mg./100 gm.	*mg./100 gm.*	*mg./100 gm.*
Garden-fresh				
Sept. 30 to Oct. 9	New York*	45 to 76	.10 to .13	.20 to .23
Market-fresh				
Oct. 21 to Nov. 19	New York**	56 to 73	.08 to .13	.17 to .23
Nov. 21 to Dec. 8	New York†	44 to 81	.11 to .13	.19 to .23
Dec. 15 to Apr. 15	Texas	13 to 77	.10 to .13	.20 to .25

* Cornell University gardens, Ithaca.
** Elmira vicinity.
† Rochester vicinity.

ranged as follows: ascorbic acid (34 samples) 13 to 81 mg.; thiamin (26 samples) .08 to .13 mg.; riboflavin (26 samples) .17 to .25 mg. per 100 gm. New York spinach tested during the fall months (October to December) had a higher ascorbic acid content (44 to 81 mg.) than some of the Texas spinach during the winter months (December to April), *i.e.*, 13 to 77 mg. per 100 gm. (Table 1). The slight difference in the thiamin and riboflavin content of the spinach from these areas fell within the range of experimental error.

When the amount of water was increased four times above the amount required to cover the spinach as it began to cook in the steam-jacketed kettles, the ascorbic acid retention was decreased by 10 per cent. In the 15-lb. lots, boiled in the 25-gal. steam-jacketed kettle with 8 qt. water, 50 per cent of the ascorbic acid was retained. When the water was increased to 32 qt. and the 40-gal. kettle used, 40 per cent was retained (Table 2). No comparisons were made in the retention of thiamin and riboflavin; about 80 per cent of the thiamin and riboflavin was retained when the smaller amount of water was used.

Identical quantities of spinach cooked in a container on top of the range and in a U. S. Army field range with varying amounts of water retained approximately the same percentage of ascorbic acid (Table 2). Spinach in 15-lb. lots, boiled on top of the range with 8 qt. and 2 qt. water, respectively, retained 32 and 33 per cent ascorbic acid; however, spinach boiled in the smaller quantity of water required more time to reach a stage of doneness than that boiled in 8 qt. water. When 15-lb. lots were cooked in 2 qt. water in the U. S. Army field range, 31 per cent ascorbic acid was retained.

The length of time required to return the water to the boiling stage depended on the quantity of water used and the concentration of heat on the bottom and sides of the cooking container. Ascorbic acid retention was lower in those methods in which the water stopped boiling after the spinach was added. During the 5 to 12 min. required to return the water to boiling (top-of-range methods), conditions were optimum for the activity of the ascorbic acid oxidizing enzymes. Fenton and Tressler (18) reported that fresh peas and Swiss chard, in home-cooking methods, had the greatest rate of loss of ascorbic acid during the first 2 min. of cooking, or the time required for the water to return to boiling after adding the vegetables.

TABLE 2

*The effect of increasing the amount of water on the retention of vitamins in cooking spinach in different types of equipment**

TYPE OF EQUIPMENT AND CAPACITY	QUANTITY OF WATER	COOKING TIME		ASCORBIC ACID		THIAMIN		RIBOFLAVIN	
		Total	Actual boiling	Retention	Solution	Retention	Solution	Retention	Solution
	qt.	*min.*		%	%	%	%	%	%
Steam-jacketed kettle									
25-gal.	8**	6	6	50	24	79	19	80	21
25-gal.	16	5	5	47	27	—	—	—	—
40-gal.	32	4	4	40	41	—	—	—	—
Stockpot on gas range									
16-gal.	2**	17	5	33	23	—	—	—	—
16-gal.	8	13	5	32	24	—	—	—	—
Stockpot in U. S. Army field range									
16-gal.	2**	10 to 14	5	31	20	—	—	—	—

* The data are averages of at least 5 cooking studies. Fifteen-lb. lots were used in each study. Where no figures are given, the samples were not analyzed for the vitamin.
** Minimum amount of water for type and capacity of equipment.

Increasing the quantity of spinach cooked at one time decreased the ascorbic acid retention (Table 3). The slight differences in the thiamin and riboflavin retention were within the range of experimental error. When boiled in steam-jacketed kettles, 5-lb. lots in $2\frac{2}{3}$ qt. water retained 17 per cent more ascorbic acid than 15-lb. lots in 8 qt. water, and 28 per cent more than 30-lb. lots in 16 qt. water. When boiled in a stockpot on a range, 5-lb. lots in $2\frac{2}{3}$ qt. water retained 21 per cent more than 15-lb. lots boiled in 8 qt. water.

In boiling 12-lb. lots of garden-fresh spinach in 8 qt. water in the 25-gal. steam-jacketed kettle, 42 per cent of the ascorbic acid was retained; in boiling 15-lb. lots in 8 qt. water 53 per cent was retained (Table 4). Thiamin and riboflavin retentions were slightly higher in the 15-lb. lots than in the 12-lb. lots. Less of these vitamins was found in the cooking water when the proportion of spinach to water was higher.

Thirteen per cent more of the ascorbic acid was destroyed in cooking the 15-lb. lots of the market-fresh spinach than in cooking the same amount of garden-fresh spinach. The explanation might be that some dehydroascorbic acid was

formed during the standing of the market-fresh spinach and perhaps a further breakdown occurred during the cooking; the differences in thiamin and riboflavin retentions were within the range of experimental error.

Identical quantities of spinach cooked in the steam-jacketed kettles and in a pressure-type steamer retained the same percentages of ascorbic acid; more ascorbic acid was retained in cooking in the steam-jacketed kettle than in stockpots on a range or in a U. S. Army field range (Table 5). Five-lb. lots retained ascorbic acid as follows: in the pressure steamer, 68 per cent; in the 5-gal. steam-jacketed kettle, 67 per cent; in the stockpot on a range, 53 per cent. As stated previously, the ascorbic acid retention was decreased in those methods in which the water stopped boiling after the spinach was added.

When 15-lb. lots of spinach were cooked in the 25-gal. steam-jacketed kettle and in the stockpot, the former again resulted in better retention of ascorbic acid, (50 and 32 per cent, respectively). Spinach in 15-lb. lots was not cooked in the steamer since 5 lb. uncooked spinach filled one steamer basket.

TABLE 3

*The effect of increasing the amount of spinach boiled at one time on the retention of vitamins**

QUANTITY USED	TYPE OF EQUIPMENT AND CAPACITY	QUANTITY OF WATER**	COOKING TIME		ASCORBIC ACID		THIAMIN		RIBOFLAVIN	
			Total	Actual boiling	Retention	Solution	Retention	Solution	Retention	Solution
lb.		*qt.*	*min.*		%	%	%	%	%	%
	Steam-jacketed kettle									
5	5-gal.	2⅔	5	5	67	21	81	14	89	10
15	25-gal.	8	6	6	50	24	79	19	80	21
30	40-gal.	16	5	5	39	27	—	—	—	—
	Stockpot on gas range									
5	8½-gal.	2⅔	8	5	53	19	—	—	—	—
15	16-gal.	8	13	5	32	23	—	—	—	—

* Based on 5 studies. Where no figures are given, samples were not analyzed for the vitamin. Differences in 5-lb. and 15-lb. lots were within the range of experimental error.

** The water was increased in proportion to the weight of the spinach.

When boiled in the U. S. Army field range, 15-lb. lots retained about the same percentage (31) of ascorbic acid as 15-lb. lots cooked in a stockpot on a range. Cooking time was 10 to 14 min., actual boiling time 5 min.

Spinach cooked in the steam-jacketed kettle and the pressure-type steamer retained about the same percentage of thiamin and riboflavin. The thiamin and riboflavin retentions in 5-lb. lots cooked in the steamer were 84 and 97 per cent, respectively; cooked in 5-lb. lots in the 5-gal. steam-jacketed kettle they were 81 and 89 per cent; and in the 15-lb. lots in the 25-gal. steam-jacketed kettle they were 79 and 80 per cent, respectively (Table 5). The slightly greater riboflavin retention in the 5-lb. lots as compared with the 15-lb. lots may be within the range of experimental error.

Drained, cooked spinach lost ascorbic acid when held in a heated food service unit. The spinach boiled in the 5-gal. steam-jacketed kettle, drained, and held at 150°F. in a heated food service unit, retained ascorbic acid as follows: 85 per cent after 15 min.; 61 per cent after 30 min.; and 26 per cent after 120 min. Thiamin and riboflavin determinations were not made on held spinach. Investigators (19) have reported no appreciable loss of thiamin in steam-cooked dehydrated beets, cabbage, and rutabagas after holding for 1 hr. in an institution-size warming oven, during which period all the water was absorbed by the vegetables. This was also true of the spinach in this study.

Subjective ratings of palatability were not recorded, except to establish cooking time for each procedure used in this study. Although there was some variation in the final product, all the cooked spinach was satisfactory for service from the standpoint of palatability and appearance.

TABLE 4

*Ascorbic acid, thiamin, and riboflavin retention in garden-fresh and market-fresh spinach boiled in a 25-gal. steam-jacketed kettle**

QUANTITY USED AND SOURCE	COOKING TIME	ASCORBIC ACID		THIAMIN		RIBOFLAVIN	
		Retention	Solution	Retention	Solution	Retention	Solution
lb.	*min.*	%	%	%	%	%	%
12 garden**	4	42	43	46	43	50	39
15 garden†	5	53	34	57	32	68	18
15 market**	6	50	24	79	19	80	21

* Eight qt. water was used in each cooking procedure.

** Based on 5 studies on ascorbic acid; 3 studies on thiamin and riboflavin.

† Based on 3 studies on ascorbic acid, thiamin, and riboflavin.

TABLE 5

*The effect on vitamin retention in spinach cooked in different types of institution equipment**

QUANTITY USED AND TYPE OF EQUIPMENT	QUANTITY OF WATER	COOKING TIME		ASCORBIC ACID		THIAMIN		RIBOFLAVIN	
		Total	Actual boiling	Retention	Solution	Retention	Solution	Retention	Solution
	qt.	*min.*		%	%	%	%	%	%
5-lb. lots									
Pressure steamer**	0	5	—	68	—†	84	—†	97	—†
5-gal. steam-jacketed kettle	2⅔	5	5	67	21	81	14	89	10
8½-gal. stockpot on range	2⅔	8	3	53	19	—	—	—	—
15-lb. lots									
25-gal. steam-jacketed kettle	8	6	6	50	24	79	19	80	21
16-gal. stockpot on range	8	13	5	32	23	—	—	—	—
16-gal. stockpot in U. S. Army field range	2	10 to 14	5	31	20	—	—	—	—

* Based on 5 studies. Where no figures are given, sample was not analyzed for the vitamin.

** Five pounds uncooked spinach filled the container.

† No water.

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The Army Still Needs Dietitians

There are almost 8,000,000 men in the Army of the United States, only a small number of whom are serving in the continental United States. The remainder are engaged in the most hazardous occupation the world has ever known. They have left the pleasures, comforts, comparative safety of their homes to face the prospect of indescribable hardships and terrors in foreign lands.

Sacrifice takes on a new meaning when we consider what the Army is being called upon to give up and endure to preserve our democratic way of life. They do not want oversolicitous sympathy nor pity. They do want, and have every right to expect, that when they become sick or disabled in battle they will be given, without stint, all the skill, care, and facilities that will preserve their lives, minimize their disabilities, and speedily restore them to health. This is the mission of the Medical Department. How well it is accomplishing that mission has been brought to you through every agency of information.

Through new discoveries, new methods, new skills, medicine has made eminent progress in the care and treatment of the sick and wounded. The advances in nutrition, and especially in our understanding of the importance of certain minerals, the vitamins, and the amino acids in the maintenance and repair of body tissues, are a necessary part of that progress. The skill of our physicians and surgeons must be supported by all possible facilities if these men of the Army are to receive the best medical care and be given every advantage for early medical rehabilitation.

The Army has 60 general hospitals in the United States for the care of sick and wounded. These are rapidly filling to capacity with men who have seen action, and many more casualties will come back rightfully expecting skilled care. We must have not only skilled physicians and surgeons, but also skilled dietitians who will carry through medical recommendations and restore and maintain the best level of nutrition in these men in order to restore them speedily to health and vigor. In this Service Command alone we have less than one half the number of dietitians required by the tables of organization set up for the adequate functioning of these installations. I think it can fairly be assumed that this situation is general.

You have chosen to affiliate yourselves with a traditionally loyal and admirable profession. This Army of 8,000,000 men is looking to you to extend your skilled hands in their hour of need. Your organization must be responsive to the needs of those you have been trained to serve. These men who are truly sacrificing so very much expect not good intentions but material help.

I would like to quote from an abstract of a recent address by the Secretary of War:

"I have just returned from a three weeks' trip to the fighting fronts in Italy and France. To say that it was inspiring is to understate one of the most significant experiences of my life. In the short time that was available I covered a great deal of ground and saw and talked to many soldiers and their principal commanders. As a result of my crowded and rapidly moving journey, one outstanding point is clear. The people of the United States have fighting for this nation abroad the most efficient, aggressive, and potentially powerful force on the ground, on the sea, and in the air that history has seen. We think we know the human element of this army, but few of us here would recognize the skilled, relentless fighters that are the product of our homes. They are bronzed, physically fit, and confident.

"When they are hurt, they have the assistance of an extraordinarily effective medical service, which embraces more than medical science. The fight for the soldier's life begins the minute he is hit. It is carried on by medical personnel in the aid stations on the very battlefield itself, then in the evacuation hospitals, utilizing every aid of modern medical science and constantly inventing new surgical methods. These efforts have raised the life expectancy of our wounded to an amazingly high figure. The attitude of these wounded men will always be, to me, unforgettable. It should be so to every American no matter what his adversity. I have yet to see one of the wounded whom I have met—many of them gravely hurt—who whined or whimpered. I have yet to see a single one who did not try to smile and shake my hand.

"I believe I know my countrymen and countrywomen well enough to realize that none of them will want to carry on his or her conscience the knowledge that any action or inaction on his or her part will weaken the superb fighting spirit of our soldiers, or deny to them anything of which they are in need. It is inconceivable that anyone of us can fail those splendid men I have just seen on the battlefields and in the hospitals and those whose honored names are written on the ordered white crosses in foreign fields."

How can you as individuals or as an organization deprive any one of these 8,000,000 men of your Army of the benefits of your knowledge, training and skill and remain loyal and true to the traditions and ideals of the profession with which you are associated?

The Army needs dietitians now to care for these men who are sacrificing so much that you and yours may live in peace and happiness and safety.—*Lt. Col. William R. Albus, M.C., A.U.S., in an address before the American Dietetic Association, Chicago, October 25, 1944.*

THE VITAMIN K CONTENT OF THE CALIFORNIA AVOCADO[1]

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THE importance of vitamin K in human physiology, coupled with the possibility that the California avocado with its high oil content might contain considerable amounts of this fat-soluble vitamin, suggested the investigation of the vitamin K activity of the avocado. During the last few years many improvements in the methods for the bio-assay of vitamin K have been made (1–5) and Ansbacher (6) has recently reviewed the biological procedures available. The method tentatively adopted by the A.O.A.C. (7, 8) in 1941 was used in this investigation. All of the avocados tested were of the Fuerte variety (Calavo).

TABLE 1
Vitamin K content of the California avocado

GROUP	NO. CHICKS TESTED	TOTAL DOSE ADMINISTERED	AVERAGE PROTHROMBIN TIME
			seconds
1	15	Negative controls 0.1 ml. propylene glycol	69.8
		2-methyl-1,4-naphthoquinone	
		mcg.	
2	6	0.146	60.4
3	6	0.40	53.3
4	6	0.80	45.5
5	12	1.30	32.2
6	9	1.96	24.2
		Fresh California avocado	
		ml.	
7	7	7.0	51.9
8	8	10.5	42.3
9	13	14.0	37.3

EXPERIMENTAL

Day-old white Leghorn baby chicks that had not been fed were placed in electrically-heated (85 to 90°F.) chicken battery brooders on wire mesh floors. Food and water placed outside the compartments were accessible to the chicks through openings adjusted to permit only the head of the chick to pass. Fresh distilled water was provided twice daily, and any feed that became wet was discarded. Extra care was used to prevent the chicks from access to their droppings. Any unused portions of feed were discarded every 3 to 4 days. All chicks received the following basal ration:

Extracted sardine (pilchard) meal[2] 17.5 per cent, extracted dried brewers' yeast[2] 7.5 per cent, ground polished rice 72.5 per cent, U.S.P. cod liver oil 1.0 per cent, U.S.P. calcium carbonate 0.5 per cent, sodium chloride[3] 1.0 per cent.

On the tenth day of the experiment the prothrombin time of the blood (8) of 4 chicks was determined and found to be above 60 sec. It was then assumed that the chicks were depleted. It was found in preliminary experiments that if a longer depletion period is used severe hemorrhage will develop in the negative control chicks before the test is completed. The chicks were then divided into groups, discarding any gross deviations from the average. Starting on the tenth day of the experiment the supplements were administered orally in 4 daily doses with a $\frac{1}{2}$-cc. tuberculin syringe using a blunt No. 18 needle; 2-methyl-1,4-naphthoquinone[4] dissolved in propylene glycol was used as a standard for the assay. In preparing the solution, it was first dissolved in a small amount of 95 per cent ethanol to speed up the rate of solution and then made to volume with propylene glycol. The solutions actually administered were prepared by dilution from the original, thus leaving a negligible amount of alcohol in them. The daily supplements administered ranged in volume from 0.1 ml. to 0.2 ml.

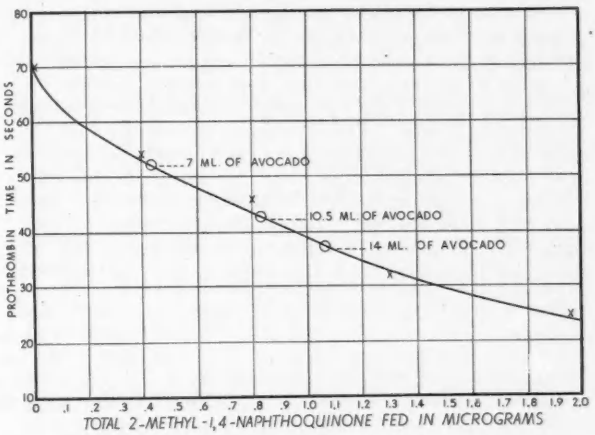
PROTHROMBIN TIME IN SECONDS
7 ML. OF AVOCADO
10.5 ML. OF AVOCADO
14 ML. OF AVOCADO
TOTAL 2-METHYL-1,4-NAPHTHOQUINONE FED IN MICROGRAMS

FIG. 1. *Vitamin K content of California avocado*

TABLE 2
Table of vitamin K values

MATERIAL	WEIGHT OF AVERAGE PORTION EATEN	VITAMIN K CONTENT PER PORTION EXPRESSED IN TERMS OF 2-METHYL-1,4-NAPHTHOQUINONE USING DAM'S CONVERSION FACTOR*
	gm.	*mcg.*
Calavo	100	8
Spinach, raw	100	176
Tomatoes, ripe	100	12
Cabbage (inner leaves), raw	57	18
Cauliflower (flower), raw	100	23
Strawberries, ripe	100	6
Oats	25	9.1
Corn meal	30	5.3
Carrots, raw	100	5.3
Potatoes, raw	120	10.7

* These figures are based upon an interconversion factor of 2 between vitamin K and 2-methyl-1,4-naphthoquinone as recommended by Dam (10), instead of the factor of 3.3 as suggested by Rosenberg (9).

In the case of the avocado, a special technique was developed in order to administer the large doses quantitatively. The avocado was prepared fresh daily by blending in the Waring Blendor until a smooth paste was formed. This was administered directly into the chick's crop from a 10-ml. syringe using a $\frac{1}{16}$-in. I.D. soft rubber tubing in place of a needle which was inserted first by a twisting motion through the mouth. As much as 2 ml. avocado can be administered at one time by this method. In the

[1] Supported by a grant from the Avocado Growers of California. Received for publication February 10, 1944.
[2] Extracted for 24 hr. with ethyl ether in a Soxhlet extractor.
[3] Contains 0.5% manganese added as $MnSO_4 \cdot H_2O$.
[4] Obtained from SMA Corporation, Chagrin Falls, Ohio.

case of the larger doses two feedings were made per day at 5-hour intervals. Twenty-four hours after administering the last supplements the chicks were killed by cutting their heads off with scissors. Individual blood samples were collected and their prothrombin times determined exactly as described by Almquist (7, 8). The values were averaged for each group of chicks. All chicks showing hemorrhage were discarded.

RESULTS

Table 1 and Figure 1 show the effect of varying amounts of 2-methyl-1,4-naphthoquinone on the average prothrombin time of chick's blood. Using 0.9385 gm. as the weight of 1 ml. blended avocado, the vitamin K activity, expressed as 2-methyl-1,4-naphthoquinone, is calculated to be 8 mcg. per 100 gm. A search of the literature for vitamin K potencies of fruits, vegetables, and cereals, reveals very little information that will enable the authors to obtain comparable figures. This is mainly due to the fact that vitamin K assays published in the past have been expressed in at least 7 different units where the interconversion factors by no means have been definitely established. Upon examination of the very comprehensive review by Ansbacher (6), Rosenberg's reference to standards (9), and papers by Dam *et al.* (3, 5, 10), Table 2, showing comparative vitamin K values, has been set up to represent what the authors judge to be the most probable vitamin K values for several vegetables, fruits, and cereals, all expressed in terms of micrograms of 2-methyl-1,4-naphthoquinone per portion.

SUMMARY

The vitamin K content of the California avocado (Fuerte variety) was determined by the tentative A.O.A.C. method of Almquist. A vitamin K activity expressed as 2-methyl-1,4-naphthoquinone of 8 mcg. per 100 gm. avocado (edible portion) was found.

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Swift Fellowship in Applied Nutrition

In May 1942 a new program of fellowships in nutrition research was established by the Swift Foundation and made available to Canadian universities and medical schools. The president of the foundation announced the twofold purpose of these fellowships as: the development of fundamental information on the nutritive properties of foods; and the application of this to the improvement of Canadian diet and health.

Dr. Edna Guest, chairman of the Health and Nutrition Committee of the National Council of Women, an organization similar to our Federated Women's Clubs, became interested in the possibilities of adapting the second purpose of this foundation to the needs of Canadian homemakers in a very practical way. Her efforts resulted in an appropriation from the Swift Foundation for a Fellowship in Applied Nutrition. Frances McKay, then director of the women's nutrition program for the Manitoba government, was awarded this fellowship for 9 months. She traveled from the Maritime Province to Vancouver, working in every province. She visited 63 cities, working through established community nutrition committees and helping to organize community work where no such organization existed.

In all this work, Miss McKay had the direction and support of Dr. Guest and her co-workers in the National Council of Women. Recipe booklets, Canada's official food guide, nutrition check charts, and other publications from the Nutrition Services at Ottawa were made available to Miss McKay. To further the effectiveness of the work, the services of an advance publicity and liaison worker were secured so that meetings and conferences were usually planned before Miss McKay arrived in a city.

In recognition of the fact that each community had special problems, round-table conferences were arranged with local leaders to determine the local needs, what work had been started, and what means could best be used to bring about improvements in the nutritional status of the people of the community. Thus much of the nutrition education was developed on a community rather than a provincial basis, and the field worker, because of her experiences in other communities of similar size or occupational characteristics, was able to provide practical firsthand information whereby local problems in a given community might be solved by an interchange of such experiences.

One of the advantages of the fellowship plan was its adaptability. There was no unalterable set of rules, no unchangeable formula—instead, the community in each case was encouraged to estimate its own nutritional needs, and then to cooperate and coordinate its efforts.

Miss McKay's talks on nutrition were in terms of food for good health rather than scientific principles. Her audiences were young people in grade and high schools and colleges, men's and women's clubs, church and Red Cross classes, women's institutes and other types of organizations in Canada. These meetings, also the local nutrition committees and their work, received generous newspaper publicity. As is often the case, meetings addressed by outside speakers attracted more community interest than those addressed by local speakers.

The projects conducted in connection with this Fellowship in Applied Nutrition included classes in nutrition, food clinics, food selection consultation services, nutrition poster and scrapbook contests, refresher courses in nutrition, many types of food demonstrations, a variety of displays in grocery stores and schools, films, improvement of food in industrial cafeterias, countless numbers of lectures and radio talks, the distribution of great numbers of recipe and meal-planning booklets, successful nutrition weeks, plays, pageants, and many other devices designed to promote improved nutrition in public eating places as well as in the homes throughout rural and urban Canada.

The effectiveness of this experiment is summarized in the report, which concludes as follows: "In response to a specific need, the fellowship sought to demonstrate by what means that need might be met. The communities in which the program has been carried out have themselves provided the solutions to many of their current nutrition problems. Though the solutions of today may not be adequate for tomorrow, there is every reason to believe that the vision and energy of professional leaders and voluntary workers—as revealed through this experiment in applied nutrition—will prove equal to the demands of Canada's future."—*Abstract of a report presented by Beth B. McLean, Home Economics Department, Research Laboratories, Swift and Company, before the American Dietetic Association, Chicago, October 27, 1944.*

THE PROBLEM OF RELIEF IN LIBERATED COUNTRIES[1]

ROY F. HENDRICKSON

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AN AUTHENTIC picture of the relief needs of Europe will first become available when German resistance finally collapses. Then the effects of the war can be appraised and observers will at last be able to communicate their findings.

Meantime we are not without information, but it is subject to change by reason of continued warfare and the limitations on reliable communication into enemy-occupied areas.

But of some things we can already be certain. Because the war has been carried on over such vast areas, the aggregate damage done is the greatest in history. The needs for food, clothing, textiles, medical supplies, and other essentials of living are acute. But there are wide variations in the intensity of need.

In the first place, the war, while fought over a large area, has been intensive in certain zones and there the scorched earth policy has been commonplace. In the second place, there is wide variation in the indigenous resources of Europe; some areas have always been relatively self-sufficient; others highly dependent upon imports from abroad.

Third, Hitler's policy has not been consistent with respect to areas or peoples. He let Greece starve until finally agreeing to permit the allies to send in food, mainly from the United States and Canada, shipped there on Swedish boats and distributed by a neutral commission of Swedes and Swiss. He marked the Jews and certain other minority groups for slow annihilation through limiting their rations below any acceptable standard of adequate nutrition as a part of a deliberate campaign of eliminating them.

Another factor, particularly in the case of food, is that greater military significance is attached to some areas than others, and some areas were merely handier, more available for the German extraction process. Poland, for instance, after being fought over several times, has always been within easy reaching distance of the German armies and her resources have been most intensively raided.

For many of these areas liberation means not only relief from German political tyranny but relief from its plundering techniques. France, for instance, contributed one third of more than 10,000,000 tons of food which Germany imported during the year which ended last March. Liberation meant to France a relief from this toll.

In some areas the deficits represented by the difference between indigenous supplies of food and a minimum standard of nutrition may run as small as 300 calories per capita; in other areas it will be closer to 1000. In some areas with relatively good prewar wardrobe standards reflecting a good standard of living, the clothing situation while not good is better far than in areas where clothing was scarce at the start of the war and has grown steadily more scarce throughout the conflict.

It is estimated that more than 20,000,000 persons have been displaced, taken from their homes as conscripted labor for German farms and factories. The war-torn homes resulting from this will leave a mark that is not easily erased. The degree of medical destitution can only be estimated, but the estimates which seem most reliable that have come to my attention indicate that more than 60,000,000 persons in Europe, exclusive of Russia, exclusive of Germany and its satellites, are medically destitute and many medical supplies have not been available for years past.

[1]Presented before the American Dietetic Association, Chicago, October 25, 1944.

HOW UNRRA WILL SUPPLY RELIEF

How is this great humanitarian problem to be met this time? The forty-four united and associated nations who created and are members of the United Nations Relief and Rehabilitation Administration have determined that the job must be done and that they will cooperate in seeing that it is done. They formed a Council which has met twice, first at Atlantic City, and more recently at Montreal, Canada, and which is scheduled to meet twice yearly hereafter during the transitory life of UNRRA. The peak of activity will be passed two years after the close of the war, perhaps sooner if food and textile production is restored quickly.

The nations have agreed that those countries which have not been occupied by the enemy will contribute, where they feel they can afford it, one per cent of their national income in 1943. They will make 10 per cent of their contribution available in convertible exchange. The remaining 90 per cent is to be available in goods from the contributing country to be drawn upon as needed by UNRRA.

The United States, with the largest income, is the largest contributor. Congress has authorized appropriations up to $1,350,000,000 and has appropriated as its first instalment $800,000,000. The United Kingdom has made available a sum somewhat above one per cent of its estimated national income, a contribution equivalent approximately to $320,000,000. Canada has made available $77,000,000, one per cent of its income; and small Iceland, the first to make a contribution, paid its second instalment of $200,000 a few days ago. Brazil has contributed $30,000,000, and many other nations have, or are about to make their contributions, anxious to do their part in helping bind up the wounds of war with a program strictly limited to relief and rehabilitation objectives.

In organizing UNRRA and adopting principles to govern its program, its member nations undertook a unique effort in the international field. They decided that the organization should not engage in reconstruction activities. These involve complex and expensive work which will require many years and which each nation can best undertake for itself in its own way. They decided to offer assistance to governments who desired assistance and who were without financial resources to meet the costs of emergency relief and rehabilitation. They provided that the inability of nations to finance their own relief and rehabilitation should be examined by a committee of representatives of other nations.

Thus far one of the outstanding evidences of the existence of a healthy determination of the peoples of occupied areas to do things themselves is the fact that a number of nations, severely injured by German occupation, have undertaken to finance their own relief and rehabilitation activities.

France, Belgium, the Netherlands, Denmark and Norway, all occupied for long periods, have indicated that they will seek to finance their own needs out of their foreign exchange resources. Some nations are less fortunate, their foreign exchange resources non-existent or minor, and they will need assistance, and the other nations are anxious to help them. Greece, Yugoslavia, Poland, and Czechoslovakia all will require help, help for which they, themselves, cannot pay in foreign exchange.

From the outset Governor Lehman, the Director General, has adopted for UNRRA the slogan, "To help the liberated peoples to help themselves." Assistance in the

field of health, welfare, and the necessary repatriation and return home of millions of persons will be important programs of UNRRA. This will be in addition to providing emergency supplies, especially food, clothing, medical supplies, and assistance in restoring agriculture and industry to a degree where the load of relief assistance can be reduced.

While UNRRA is not authorized to provide assistance to ex-enemy areas generally, the Council voted at Montreal to authorize an expenditure not to exceed $50,000,000 to supplement existing programs of civilian relief in Italy, now mainly carried on with the assistance of the Anglo-American military forces. This program is scheduled to get under way as soon as appropriate arrangements can be made. It contemplates special assistance for children and for nursing and expectant mothers, and medical assistance above that which is now available. The program contemplates special assistance in food supplies for preschool and school children. Some of the principles of the school lunch program in this country, which has been so useful to millions of children, will find expression in the program in central and southern Italy where the level of diet is at present low and short in terms of balance.

Special feeding efforts may need to be undertaken in other areas, particularly those severely damaged by warfare. The programs will depend upon the capacity of the governments to put them into effect. Soup lines will be avoided as far as possible, but they will become necessary in some cases. Food and other supplies are to be distributed under the policy of the Council without regard to race, creed, color or political belief.

The UNRRA staff has been developed with a view to providing assistance, when called upon by governments, in the distribution of food and other supplies, especially in the development of appropriate rationing and price policies and procedures. Distribution will present exceedingly difficult problems in many areas where shortages have long been acute and where distribution pipelines are low and nearly empty.

Emphasis will be placed on attempting to restore agricultural productivity which has suffered during the war, particularly as a result of shortages of commercial fertilizer, machinery and tools, and in some areas, seeds.

NEEDS OF SPECIFIC COUNTRIES

Just as Europe's resources vary widely, so does the prospective need for supplies vary. Greece, whose agricultural resources are not large compared with her population, who has long depended upon imports of food from the outside, will require much assistance per capita of an emergency character. Germany dealt with her ruthlessly and there starvation was commonplace during the first two years of occupation. Hitler apparently decided she was unimportant in his economic orbit; left to her own limited resources, the needs for food grew desperate. While assisted by Canadian, American and other food supplies during the past two years, distributed by the Swedish-Swiss Commission, her diet level measured in calories daily is well below 2000 on the average, possibly being lower than 1600 calories.

In Yugoslavia, long a raw food materials exporting area, the stubborn resistance to the Germans has had its repercussions on agricultural production and distribution. While some areas have been productive, the Germans have extracted large amounts of food; the distribution system has broken down and those who have waged continuous warfare in the mountains have done so in the face of extremely short food supplies. Refugees from Yugoslavia, many thousands of them now in UNRRA camps maintained in North Africa, bear evidence of the effects of prolonged undernourishment.

In Czechoslovakia where agricultural production has been diversified, Germans have seized large quantities of food annually and disturbed the agricultural production pattern by overemphasizing sugar needed for the German industrial machine with the result that food needs, especially in the heavily populated industrial areas, are acute.

Norway depended on imports of food, feed, and fodder to support her relatively satisfactory prewar diet and has had a desperate time of it. The average Norwegian has been eating about 400 lb. potatoes annually. It hardly seems likely that potatoes will be an interesting food to them in postwar years. Her fisheries have been curtailed, her milk production sharply reduced. In common with all European nations, she has been starved for fats, and fats singly constitute the item most in demand there and elsewhere for relief feeding.

France faces a difficult problem until the next crop year. Not only are some foods in short supply, but her internal distribution system has suffered greatly by reason of a shortage of transport facilities which cannot be readily remedied because of the urgency of military operations. It is difficult to move foods from some of her surplus producing areas to the deficit areas, especially the cities, and military assistance has been provided effectively but with great difficulty.

For Belgium the problem is becoming acute because of military operations in the area coupled with the fact that she has now lost supplies that Germany had permitted her to import in order to obtain industrial production there.

For the Netherlands, flooding of fertile lands has long been a threat, already partly realized with a dangerous potentiality of further flooding. The alkaline deposits following the inflow of sea water may render many areas nonproductive while remedial measures are taken over a period of years.

Denmark, like the others, has been called upon to contribute substantial quantities of food to Germany. And now she is being pressed harder than ever because Germany has lost other sources of food.

It is this food extracted from occupied and satellite areas which has helped Germany maintain an adequate nutritive level through the war. But she has lost substantial quantities of these imports by reason of the Russian offensive in Poland, Romania, Bulgaria, Hungary and Yugoslavia, and the Anglo-American liberation of France, Belgium and parts of Italy and the Netherlands.

UNRRA faces one of its most difficult supply problems in the field of clothing and textiles. In agreement with the governments in exile, it plans to lay its principal emphasis on supplying raw materials, cotton and wool, which are in ample world supply, placing secondary emphasis upon cloth and findings, and finally upon clothing. A certain amount of clothing must be stocked to meet emergency situations, to help persons whose resources are gone, but as far as possible it is planned to supply raw materials in the case of food and clothing. This is logical because larger needs can be met from the standpoint of economy, and the processing and home-making resources of the liberated peoples can be utilized in a practical way. Too, it permits utilizing these materials in ways characteristic of the country in question.

In the case of food, the emphasis will be on fats, cereal grains, meat, and processed milk, with every effort made where the receiving nation prefers to obtain oil seeds and other feeds to restore dairy production. Cow numbers have declined but the European peasant has sacrificed per animal production rather than reduce herds, whenever possible.

THE PROGRAM FOR THE FUTURE

In the Anglo-American theaters of war, the military authorities accept a first brief period of responsibility for assistance. During that period the exigencies of military operations, the pressure on ocean and inland transport, definitely limit the extent of assistance which can be provided.

In the period following, the main supply job of UNRRA will be to seek to meet the deficit representing the difference between indigenous supplies and standards adopted as objectives by the Council of 44 nations, after careful technical work by committees on which the receiving nations and some of the principal supplying nations have been represented. In the case of food, a standard of 2000 calories was recommended as the minimum during the difficult period of military operations, ascending to 2650 calories as soon as possible. The subcommittee of nations headed by Dr. Karl Evang, Norwegian public health official of the government in exile and an eminent nutritionist, who recommended the standard for food had this to say, which I believe will be of interest to this group:

> The subcommittee recognizes the difficulties inherent in the use of a calorie level on which to base estimates of requirements and the many assumptions which have to be made in converting foods into terms of nutrients. It has, however, reluctantly adopted the calorie level as a basis for making preliminary over-all estimates for the common pool of foods to be requested from the Combined Food Board for relief purposes, on the understanding that this will be considered along with the figures for the different commodities submitted to the Director General by the Governments concerned. On this basis it recommends the use of an average level of consumption of the total population of each of the countries concerned of 2,650 calories (at the retail stage) per head per day for essential relief needs for the period under consideration.
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> If, however, indigenous supplies are in fact to become fully available for the whole population steps must be taken to induce hoarders to unload their stocks and to discourage distribution of food through illegal channels. The subcommittee believes that this can be done only if:
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> (a) a sufficient quantity of one or more staple commodities (*e.g.* wheat) could be imported into each liberated country to meet the demand not only for that food but the unsatisfiable demand for commodities still in short supply.
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> (b) effective administrative machinery (including a rationing system) already in existence could be kept working under the control of the reinstated national authorities, or, where it no longer exists, could be set up rapidly.
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> The easiest and most practical way of increasing the available supplies of home produced food and of improving the diet of liberated Allied peoples would be to provide enough wheat to enable bread (of a grain composition acceptable to the country concerned) to be de-rationed as soon as possible and to provide reasonable quantities of some commodities of high morale value which have been in short supply, or even entirely lacking, such as coffee.

The resources of UNRRA are in the vicinity of two billion dollars as presently estimated, and of this a reserve for use in the Far East is necessary. There the area which will require UNRRA assistance in the largest degree will be China. Most of the other occupied areas of the Far East will not require UNRRA financial assistance; but as in the case of areas not requiring financial assistance, the impact on world supplies will be just as significant as if UNRRA were financing them. But I do not think the impact on world supplies will be severe in many cases, especially after military operations pass their peak.

We are fortunate that the supply of raw cotton and wool appears adequate; that the world supplies of wheat are also relatively abundant. The problems with respect to fats, meats, processed milks, and oil seeds are much more difficult.

Binding up the wounds of war will be a difficult problem at best. From my own observations, I feel that the nations who must have assistance are going to be fair in making their requests. The spirit thus far manifested by the nations who will be making the contributions of supplies, funds, and services indicates that they are clearly determined to help meet the deep human need.

Everyone realizes that the contribution of supplies and services will simply help to make up a deficit created by war, by circumstances beyond the control of the areas being assisted. Everyone realizes, too, I believe, that the aid which will be given can make up for only a part of the damage done. Just as reconstruction, an effort outside of UNRRA's field, will require many years, so too will many of the effects of war live on for many years to come in the liberated areas.

The effects of malnutrition on a generation of children, the losses of heads of families, the break-up of homes, all represent something which cannot be restored. The large numbers of homeless children, the wide incidence of diseases which come in the wake of undernourishment, the destruction of homes and possessions, these constitute problems where help can be provided but the prewar status quo cannot be recaptured. But out of the selflessness, the discipline and experience of resistance movements, of maturing and war-tried nationalistic and patriotic impulses, comes a foundation for rejuvenation of the peoples of the liberated areas. With limited help during an emergency period, the liberated peoples have the spirit to restore old and proud nations to their prestige of the days which antedated the rise of Hitler. A little help from the nations which have not been occupied will go a long way; the elimination of Hitler and the restoration of the liberated peoples to seek their own destiny will do the rest and more.

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Motivating the Desire for Nutrition Information. In Baltimore there are 30,000 substandard homes. I am particularly interested in the people who have to live in these homes. Incidentally, I have heard it estimated that these homes could be replaced with standard low-cost dwellings for approximately the amount the United States is spending on the war in one half a day. In some of these areas there are 70 to 80 children to a block. A large percentage of the families in these areas are the families of servicemen who are fighting to preserve our way of life. Much emphasis has recently been given the importance of nutrition, state and local nutrition committees have been organized, classes held, pamphlets distributed, but somehow the knowledge has not reached these people—the very ones who need it most. Some have said "these people are indifferent, they do not want to change their ways, we have approached them but they do not respond." I believe that the motivation of these people with the desire for nutrition information is a problem that requires tact, insight, imagination, and ingenuity. The librarian who took a load of books on a huckster's wagon into one of these neglected areas found that these people did want information. They did want to read and clamored for books about cooking, family feeding, child care, home nursing and good grooming. Her success with these people was so striking that the Maryland Dietetic Association felt it worthwhile to bring it to your attention at this convention and has mimeographed her complete report for distribution . . . . regarding the psychology of giving out pamphlets: "Do not have too many in sight—give them away as though they are very precious." There was a marked interest in books which dealt with the growth of the fetus before birth. Pregnant women and mothers were fascinated with books which showed how the baby developed inside their bodies. They had never understood this before. Winning the confidence of these people does require a certain type of individual. People who live in neglected areas are quick to sense a feeling of superiority in those who come to work with them. Perhaps this may be a clue, not only to satisfactory relations with people in neglected areas, but with our neighbors, or the people of South America, or the people of Europe in the postwar period. Recently, in a class conducted by an eminent nutritionist, a report on the government's present school lunch program had been given. A South American doctor turned to me and said "We have had a school lunch program in Lima, Peru, for years, and we have also the Public Restaurants which provide adequate meals in pleasant surroundings at extremely low cost. You have many wonderful things in North America which we are privileged to observe and we are grateful for the opportunity but perhaps we have a few things in South America which we might show you."—*Report presented at a conference of the Community Education Section, American Dietetic Association, October 26, by Mrs. Felisa J. Bracken, Department of Public Welfare, Baltimore.*

Editorial

THE CHICAGO MEETING

With a total registration which approached the highest peak in the Association's history, that of the 1940 prewar record in New York, the 1944 annual meeting of the American Dietetic Association in Chicago also attained in a crowded three days another record—a program unsurpassed for broad coverage of the dietitian's interests.

As a prominent member remarked at the close of the sessions: "Convention days never seem to afford time for all the visiting and exchange of ideas desirable but they surely do provide the spark for the kindling of new ideas. I think the program this year was one of the most stimulating and refreshing that I have attended. I gained new ideas for book revision, magazine articles, and for my community Red Cross activities." This undoubtedly would be echoed by the many directors of large group food services who attended, with regard to the program's excellent coverage of the directly practical problems of the administrator—labor, equipment, sanitation, food production standards, and food processing and marketing. As in recent years, too, the vast international problems of food supply and distribution were discussed from authoritative points of view.

Wartime difficulties of transportation and accommodations seemed not to dampen that bounding spirit of enthusiasm now so characteristic of these annual meetings. Harassed perhaps more than any other group of executives—since people *must* be fed—by serious employee and staff shortages, that spirit of buoyant optimism and active, intelligent interest seemed not deterred one whit. This impression is shared by others outside the dietitian's profession, as attested by comments of guest speakers and others attending the convention.

Another note of optimism can be sounded with regard to the businesslike conduct of affairs on the part of the House of Delegates. To one who attended the first meeting of this legislative body of the Association in the historic capitol building in Richmond in 1937, and has seen its members feel their way cautiously year by year to a place where their seasoned judgment can be of real value to the Association, the progress made is very evident. The skill of the presiding officers and the thoughtful yet terse discussions by the members are something of which we can be justly proud.

Perhaps a few statistics gleaned from reports given at the annual meeting will convey some impression of the growth of the Association as a whole. For example, the membership shows an 11 per cent increase for the fiscal year; 1157 applications for membership were received in 1944 and about two thirds of these were accepted. There are 1475 dietitians now serving in the Medical Department of the Army, several hundred of whom are overseas, while an increasing number may be found among the Waves and the Wacs. In 21 of the 75 approved training courses for dietitians, graduate work toward the master's degree will be optional or required in 1945 and in two of these courses—that at the State University of Iowa and the administrative course at the University of Washington, Seattle—the master's degree will be granted at the end of a year's training. A total of 962 young women, it is anticipated, will have an opportunity to complete training in the approved courses in 1945.

In keeping with postwar developments an ever-growing number of these training courses are now strictly in the administrative field, even though it should not be overlooked that sound training in the administrative aspects of food service is the basis of all the approved hospital training courses. In keeping, too, with the postwar period just ahead is the discontinuance of 26 of the accelerated training programs and the promise that 12 more will follow in this resumption of prewar procedure.

In the light of this Association's soundly and consistently progressive educational program, it seemed particularly timely that those attending the annual dinner should have been reminded of one who was largely responsible for our present standards, Dr. Ruth Wheeler, truly a great pioneer in the annals of the Association. In presenting to Dr. Wheeler, *in absentia*, a plaque bearing the Association's seal, Nelda Ross spoke as follows:

> Dr. Ruth Wheeler, a prominent and beloved member of this Association, retired from active work at Vassar College in June 1944. As a teacher, and as President of the American Dietetic Association twenty years ago, her ideals, vision, and precepts helped to lay the foundation for the present high standards of this Association. As President, she proposed the requirements for membership which are the basis of our present standards.
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> Her foresight during her term of office made the JOURNAL a reality. Today it serves to attest her wisdom. She predicted, then, that the JOURNAL would reach its full stature only with the enthusiastic support of the membership.
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> As director of the Nutrition Department of the State University of Iowa Hospitals, Dr. Wheeler was probably the first dietitian to be appointed a full professor in a college of medicine. She was also the first to teach this fundamental principle—that the therapeutic diet should be an adequate diet, simply the normal diet modified to meet special conditions. From this point a changing emphasis in medicine can be noted—that toward treating the patient as a whole, not solely as a disease entity.
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> As director of a student training course, twenty years ago, she assigned to her students those responsibilities and duties which befit the dietitian, and pioneered in obtaining for them the privilege of pursuing graduate study in the University.
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> These are but a few of her material contributions to our profession, but she gave much more to those who were privileged to know her. She transmitted to others an intangible something—something at the same time real and dynamic—yet not readily defined. It is this which always characterizes a beloved and great teacher.
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> She inspired students, staff, and professional associates by her ready scientific knowledge, and even more by her ability to put it to the test of practical application. Her interest in the individual and her idealism endeared her alike to patients and associates.
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> Every member of this Association has benefited professionally from the inspirational quality of her leadership in those early years.

At the final session of the meeting at which plans for the coming year were outlined by the section chairmen, with the incoming President, Maniza Moore, presiding, the House of Delegates voted to hold the 1945 annual meeting in Cincinnati. At the annual business meeting earlier the report of the Constitution and By-Laws Committee under the chairmanship of Anna E. Boller had been accepted with but very minor changes and with many favorable comments on the work of the committee.

Space does not permit a complete listing of national and local officers and committee members who served the Association so well through the year and at this meeting. To them full credit is due for the year's advancements and the marked success of this twenty-seventh annual meeting.

LUCY H. GILLETT RETIRES

Miss Gillett, one of the nation's first nutritionists, and author of numerous works on nutrition and food economics, and director of the Nutrition Bureau of the Community Service Society, New York, for the past thirty years, retired November 1. Entering the field at a time when the significance of nutrition had not yet found recognition in scientific circles, Miss Gillett made international history in 1917 when she published the first complete table on calories ever to be drawn up for boys and girls by ages.

Government leaders here and abroad have sought her advice on adopting model nutrition programs for their respective countries. Her *Food Primer*, translated and reprinted in several foreign languages for distribution throughout the world, was the first book to put food facts into simple language for mothers. In 1929 Miss Gillett was invited to participate in President Hoover's White House Conference on Child Health and Protection and was appointed chairman of the subcommittee on nutrition of the Medical Service Committee. In 1941 she took part in President Roosevelt's National Nutrition Conference and was co-chairman of the section on Economic Planning and Social Responsibility.

A pioneer in establishing the relation of nutrition to good health, Miss Gillett supported the early efforts of physicians in molding opinion on the importance of nutrition in medical therapy. Her research studies and educational work led to the establishment of the first bureau to teach nutrition on a community-wide basis. She became the first, and for many years was the only nutritionist in the welfare field.

Miss Gillett was also the first to popularize the principles of nutrition and her illustrated handbooks, leaflets, and charts were to become known to thousands of families in New York and elsewhere. The success of her work with school children prompted Miss Gillett to study the application of nutrition to the needs of the preschool child. Her results, published in 1924 under the title *Adapting Nutrition to the Community*, became the basis for nutrition programs for children in communities throughout the country. Meanwhile thousands of families had become familiar with her *Food for the Family* published two years earlier. As trained nutritionists were added to the staff of her bureau, Miss Gillett's program expanded into new fields including community activities, consultation service for social agencies, and educational work through the press and radio.

Miss Gillett began her professional career in 1901 as a teacher of home economics in the public schools. Later she joined the faculty of Pratt Institute as an instructor in foods and cookery, and in 1911 at Illinois Women's College she organized one of the first 4-year courses leading to a degree in home economics. While at Teachers College, Columbia University, under the direction of Professor Sherman, she embarked on a 3-year study, "Adequacy and Economy of Some City Dietaries," which included intensive laboratory research on mineral elements in foods. In 1929 she supervised another study on "The Influence of Education on Food Habits of Some New York City Families." Professor Sherman declared later that "the results of these studies revolutionized the teaching of food economics in many of our leading colleges and universities, and in addition helped improve the food habits of the population as a whole."

Her study of the food habits of New York City families convinced her of the need for a more sympathetic understanding of the mother's problems in feeding and clothing her children on a meager income. Miss Gillett was able to show that many family health problems were caused not only by low incomes but also inability to make the best use of money available. She therefore developed rules for simplifying wise food selection.

A charter member of the American Home Economics Association, Miss Gillett is also a member of the American Dietetic Association, and was vice-chairman of the Nutrition Committee of Greater New York. She was one of the founders and a former chairman of the New York Nutrition Council, organized in 1921 to promote community nutrition.

Nutrition and the War

A HOSPITAL MESS DEPARTMENT IN ITALY[1]

LT. PAULINE H. EMERSON, M.D.D., A.U.S.

Sunny Italy was not living up to its reputation of fair skies when we landed there last October after a 4-day trip from Oran, along the North African coast to Bizerte and then straight across to Naples. A group that preceded us by 3 weeks had had to wade ashore in water waist-deep, but we came from our transport by means of barges to a temporary pier at a nearby town and were really fortunate to have only rain. Open-topped trucks took us to the fair grounds, where Mussolini had celebrated his North African victories just 9 days before Italy went to war again. The Germans had used the fair grounds for an ordnance depot and came back and bombed it 4 days before we arrived, even though two hospitals had already been set up in the area. Thus there were huge craters 20 ft. deep and as far across as the width of a street, and the stucco buildings constructed with a minimum of steel reinforcements were severely damaged. Our planes previously had scored a direct hit on the dome of the theater building, part of which later became our medical building.

The women of the unit were quartered first in an automotive building at the entrance to the area. Aside from the millions of pieces of glass scattered inside and out and the shattered glass hanging from the window frames, the building was in fairly good condition. It didn't take long to clear away the debris and put up shelter halves, the buttons of which made quite a racket flapping in the breeze. That first night we were glad to go to bed at 6:30 in our clothes, sharing blankets with those whose blanket rolls had not arrived.

Absolute blackout had to be maintained in the area. For instance, cars entering the area were challenged by the guard and if their lights did not go out immediately, they were shot out. Alerts were frequent, for the front was just 38 miles away. If the reconnaissance plane, "Joe," came over in the daytime, "Jerry" was sure to come at night trying to get the ships in the harbor. Once, when he was turned back, he laid six little eggs in our area. The guard would come to the stairway and call "air raid" and we would grab helmets and clothes and troop down to the basement for protection from the flak of the anti-aircraft set up on the surrounding hills.

Next morning we heated water in our canteen cups over a bonfire for the coffee of the breakfast ration. We had K ration for lunch but by suppertime the mess department had a few field ranges going and we had hot C ration.

This day folding canvas cots and mattresses, our permanent beds, were issued and the rest of the blanket rolls came so we slept in comparative luxury.

The next day our mess department took over the restaurant building in the fair grounds and for more than a week fed three outfits. Our boys had cooked for us in Casablanca, made hot meals for us on the train from Casa to Oran, fed numerous other outfits on Goat Hill near Oran and now in Italy, again, they were on the job.

A month later, we moved to an 8-story exhibit building with no elevator service. Large openings had been covered with transluscent screening and draped with

[1] This and the following paper were read before the American Dietetic Association, Chicago, October 25, 1944. Lieutenant Emerson is now on duty at Station Hospital, Fort Snelling, Minnesota.

tarpaper for blackouts. This became our convalescent building and when the Naples current came on stoves were set up. Around Christmas we moved to an apartment house 10 minutes from the area where we had heat for the first time from small sheet-iron stoves. This was real comfort after 3 months in tents in North Africa and 2 months in temporary quarters in Italy.

The first floor of the restaurant building was assigned to us for mess kitchens and mess halls. One end of the theater building, two roadways distant from the mess kitchen, became our medical building, and an exhibit building some blocks away our surgical building. In the meantime, a dozen hospital tents were put up for convalescent patients, most of whom could come to the mess hall. A dozen prefabricated buildings were put up for orthopedic patients and two for a detachment mess hall, so that the block-long line of patients could be divided.

There was quite a bit of equipment in the mess kitchen, but aside from the sinks it could not be used until the gas and electric lines from the city could be repaired. Our first lights were candles, then an electrical line was strung up, serviced by a G. I. generator, and later we got the local current and were able to get some sulfur dioxide for the small refrigeration and ice-making units.

We had standard gasoline field ranges equipped with heavy metal ration pan and lid and two stockpots which make a double boiler. It was a problem to run five mess lines, but we did it and added a sixth and then a seventh. The Drinkwater trucks were sent to the convalescent building and "prefabs." You may look upon a galvanized can of 30-gal. capacity merely as a garbage can, but it was more than this to us. We used the G. I. can to heat water, for the storage of dry foods, for prepared vegetables and meats, and to make and serve beverages. We found it well to rotate the water and beverage cans to preserve the galvanized coating. Garbage disposal was no problem to us. What little we had was taken away by a tiny donkey-drawn cart holding two wine barrels.

One day in November we were trying to devise a serving room on the second floor of the medical building. The next day we admitted over 300 patients. The wards had neither space nor facilities for food service, so a central serving room was set up. Glibly we calculated that 20 per cent would need trays and 80 per cent would be able to go to the mess hall, only to find that it was quite the other way. We decided ahead of time that all the tray patients would be on the second floor but here again it was a case of counting chickens before they were hatched. Trays were carried to the furthest end of the third floor through two wards and down to the first floor, and for a while to an outside building. Even the space intended for the recreation room was filled with beds until we got our third building.

In line with our civilian experience, we tried to set up the trays with the cold foods and then serve the hot foods as the trays were carried by. Here again we struck a snag, since there were 300 patients to be fed on 200 trays with 200 sets of dishes. The next meal the tray carriers picked up the tray, dishes, and silver and then came by the mess line for all the foods. Later, to speed up the service, they doubled up and separated the dishes on the trays at the bedside. Trays were returned, cleared, and dishes washed throughout the whole serving period.

The corps boys were needed more and more on the wards, so we got Italian civilians to do the washing up, serving, and to help carry trays. These were under the constant supervision of the dietitian and mess department personnel and all had periodic medical examinations. It was quite a job to get them to understand that the dishwashing and rinsing water must be kept hot and changed often. They worked for 50 cents a day but were mainly interested in being fed and insisted on carrying trays on their day off so they could be sure of a meal.

Just before Thanksgiving, the surgical building was opened with the admission of some 300 patients. It was a real problem to reconstruct the roof which had been blown off by dynamite. The Engineer Corps came to our aid as they had so many times before. They put planks across the rafters, constructed skylights since there were no windows in the walls, covered the planks with tarpaper, and tarred the seams.

Our serving space in the surgical building adjoined one of the larger wards. One morning we went to serve breakfast and found 11 beds in the serving room and, what is more, there were patients in the beds and they really enjoyed being so near the source of supply. This continued for a month until a separate room could be set up.

The surgical building was some distance from the mess kitchen. The K.P.'s would get the cold foods early and then the hot foods were brought over in a 2½-ton truck. We had mostly tray patients in this building and the ambulatory patients were moved to tents or "prefabs" to make room for more casualties as they came in.

In the United States, Army hospitals have a fund from which food may be purchased at the commissary or from local merchants. Overseas you cannot count on the surrounding country for anything at first and if later there are any surplus foods, they are procured through the Quartermaster.

When we reached Italy, the civilian population was receiving black bread once in 15 days and the individual allowance was half of the size of a long French loaf. There was no spaghetti, nor the paste with which to make it. Fish is one of the principal foods in the Italian diet, but there had been no fishing for a long time. Any fresh potatoes were reserved for the civilian population. Sugar was $2.50 a pound on the black market. Crowds of hungry civilians used to collect outside the mess halls to get the scrapings from the boys' kits.

Rations were issued daily by the Quartermaster on the basis of number of patients and personnel and calculated in units of 100 men. Then for each hospital day, an additional 35 cents was allowed, which made it possible to have better soft and special diets. A 10-day menu was set up by the Quartermaster, so we knew what supplies to expect.

We were on the B ration—canned meat or frozen fresh meat when available, canned salmon, canned fruits and fruit juices, canned vegetables and some dehydrated ones, tomato juice, dried eggs, canned cheese, preserved butter (later we had fresh butter once a day), cereals to cook, prepared dessert powders, evaporated milk, coffee, tea, cocoa, and lemon cystals. The unit for bread was cut to 25 lb. due to the need up front in November, but later increased to 40 and then 62½ lb. The unit for coffee decreased to 4 lb. during the bitter cold at Cassino, also in November, but later increased to 8 lb. We appreciated the need of the men in the mountains since we had many patients from that campaign.

The canned meats of the B ration were luncheon meat, chili con carne, corned beef and hash, Vienna and pork sausage, meat and vegetable stew, meat and beans, boned chicken and war bacon. We also had war hams which are heavily salted to keep without refrigeration. They were quite palatable after being soaked in water, parboiled in a sugar solution, and then baked. The war bacon requires soaking too, and is best when sliced thin or finely diced and fried crisp.

In December we began to get frozen fresh meat twice a week and in January, once a day. This included beef for stewing or for roasting, pork and pork sausage, frankfurters, smoked meats, and chicken.

It was surprising how often our fresh meat days and convoys of new patients coincided during December. That first hot meal was mighty important to the boys who had been on cold K or C rations for weeks.

You will be surprised to learn that a favorite part of our breakfast was hot cereal served with evaporated milk. It was something most of us had not eaten since we were children. A canteen cup has the capacity of 1½ pints; we filled them well over half full with tomato or fruit juice which went a long way in supplying vitamin C. G. I. bread is made of enriched flour and eaten in large quantities and so helps supply the rest of the vitamins.

As time went on we received fresh cabbage, cauliflower, onions, green peppers, oranges, tangerines, and apples once in a while. All of these were soaked in a hypochlorite solution to guard against contamination.

I must not forget to tell you about our Thanksgiving and Christmas dinners. No doubt you saw the plans for them in the papers. Indeed, they came up to all reports and included turkey and all the fixings: dressing, cranberry sauce, and lots of brown gravy over mashed potatoes, as well as vegetables, celery, olives, nuts and candies, and apple pie.

If you were to ask what dietitians do overseas, I would reply that they do everything that can be done in regard to the food of the patients. To be more explicit, we set up simplified order forms for the wards in keeping with the foods available, listing the diets to be ordered as regular, soft and bland, liquid, special, and mess hall. Since we were functioning as an evacuation center we did not have many special diets except low-fat. Nourishments were limited to fruit juices, tomato juice, chocolate milk made of powdered milk, and crackers. We checked the census of each ward before meals and supervised all the serving. We tabulated the ward orders for the diet cooks who prepared the foods not on the regular menu and sent out all the foods to the buildings. We calculated the additional foods that could be ordered for patients and planned their use and checked the adequacy of the food served. In between times, we were able to encourage the men in the mess department. They seemed to appreciate the presence of three women in the mess department and certainly gave us the most willing cooperation.

THE TRAINING COURSE FOR DIETITIANS AT FITZSIMONS GENERAL HOSPITAL

CAPT. MILDRED ALLBRITTON, M.D.D., A.U.S.

In December 1942 our Commanding Officer, Brigadier General Omar H. Quade, returned from Washington with what seemed to me, at the time, the very worst possible information—"We are to have a dietetic training school at Fitzsimons General Hospital, and it is to begin within a few months." Needless to say, I was upset. I think I would be putting it mildly to say I was just plain scared. I had never had experience with a training course or with students; therefore, I suggested to General Quade that he recommend a transfer for me and secure a dietitian better equipped for this undertaking. He just smiled a bit and said, "I think the job is ours. We will aim to keep the Army schools as nearly alike as hospital conditions will permit. Make your plans and I'll see that you get whatever is needed." After 14 years in Army hospitals, I knew my cue to be "Yes, sir!"

Within a few weeks carpenters could be heard pounding away in our classroom, library, office, and living quarters. We had orders that Lt. Maryethel Meyer was to report to Fitzsimons as a teaching dietitian. In the meantime I was detailed to visit the dietetic school at Walter Reed General Hospital, and returned with so much information on organization and other data that it resembled a gigantic crossword puzzle, one that had to be put together in order to function. It would take considerable time to tell you of all the group meetings we had. Every officer in our hospital knew the part he was to play in training these students. The superintendents of nurses and head dietitians in the Denver hospitals cooperated by supplying affiliations in children's work and the teaching of student nurses. The interest and enthusiasm shown during this period have proved invaluable throughout the 18 months of the school's existence.

Wherever possible those officers with whom the students would work were selected to give the 196 hours of medical, surgical, meat and dairy hygiene, and administrative lectures. We felt the puzzle was beginning to take shape when this was done, schedules were completed, and the school section and living quarters were finished.

On May 1, 1943 our training course opened with 6 students. On November 1 the new class was increased to 20 students. With the May 1, 1944 class we were allowed a carry-over of 10 apprentices which gave us 30 students and apprentices.

A student's first week is spent in taking physical examinations, orientation and lectures. Throughout the remaining 6 months, lecture periods are scheduled from 1 to 3 p.m., for 4 days a week. Two afternoons are devoted to clinics. Mornings and the hours from 3 to 5:30 p.m., 6 days a week, are devoted to practical assignments under the supervision of 9 staff dietitians.

Fitzsimons General Hospital, one of the Army's largest permanent hospitals, has a bed capacity of 3600, with 2 large messes for enlisted men, 2 small messes for officers, 1 consolidated diet kitchen, and 53 wards.

Now for a tour with the student on each of her practical assignments. She spends 10 weeks in the administrative section, 4 in one of the large enlisted patients and civilian employees messes serving 1800 to 2000 men. The work is so arranged that she writes regular menus, figures per capita costs, studies plate waste and submits written reports, completes two job analyses and one work schedule, makes daily requisitions for staple and canned foods from the central storeroom, and fills out daily dairy and ice cream orders. Twice a week she writes the orders for perishable fruit and vegetables, and the weekly meat order for her needs in advance, as well as writing the daily requisitions from the central butcher shop. Four hours of her time each week are spent with the butcher observing the cuts of meat and the manner in which these orders are filled.

May I add here, that the 50 hours of lecture on meat and dairy hygiene are followed by many field trips to emphasize all phases of these lectures. The student can explain to you, if you wish, how these foods and commodities are checked and stored as well as the inventory system used for both foods and equipment. She can tell you, too, why it is so important to know correct portions and amounts, for food is sent to 36 outside wards by large food trucks. She continues with visits to the ward kitchens and submits a written report of her findings. She checks the cafeteria line during the serving period and visits the patients throughout the mess hall. She will tell you of the personnel problems and how overwhelmed she is at first to be supervising such a vast undertaking.

In the 3 weeks spent in the officer patients mess, where about 250 patients are served, the order routine remains the same except that it is on a smaller scale. In this mess we have table service, and the student checks the mess hall and waitresses before each meal. She supervises the preparation of special as well as regular diets and checks each as it is served to the waitress. She also maintains close contact with the mess hall patients.

During the week that the student spends in the bakery,

she works with the pastry crew in the morning and the bread crew in the afternoon. She builds recipes according to the needs. She helps to mix and bake every product used for that week.

For some of the students the 2 weeks spent in the storeroom and office are fascinating and exciting. Requisitions and orders from all the messes and wards are filled here, and the student learns what staple supplies are needed on a 50 or 100-bed ward, how these orders are filled and how inventories are taken and records kept. She learns to consolidate the fruit and produce orders on a bid sheet, obtains prices from the local markets, figures the consolidated menu cost each week, and studies federal specifications for foods. She goes to market with the mess officer twice a week and on her last trip is allowed to do the buying. She checks these products when delivered to be sure the orders have been correctly filled. In the office she familiarizes herself with the filing system, keeps the record cards up to date by tabulating supplies issued during the day, and gains a "talking knowledge" of a mess sheet and its purpose in an Army hospital.

We move along with the student to the 10 weeks spent in the therapeutic phase of her training. During this period she is assigned to the consolidated diet kitchen for 4 weeks, where approximately 45 types and variations of diets are prepared for some 200 special-diet patients. There is an average of 35 weighed diets daily. She writes the standard special-diet menus, *i.e.*, light, soft, convalescent ulcer, bland, low-residue, low-salt, and fat-free. She figures the cost of these diets for one week. From the daily diet chart she requisitions the food supplies needed. She watches and supervises the preparation of the food, learns to use the gram scales and to visualize amounts of foods weighed in grams as they would appear on a plate. She checks all diet foods out to the 53 ward kitchens, 14 of which are completely supervised by staff dietitians.

Two weeks are spent on surgical wards, 2 weeks on the heart and kidney wards, and 3 weeks in the gastro-intestinal and diabetic section. The same method of ordering is used for all wards. The student writes the daily special diets not included in the basic special diet menu, gives discharge diet instructions, and observes operations of special interest. She is made aware of the need for diplomacy and the value of applied psychology in handling patients and personnel. She supervises the cleaning of the kitchen and the personal appearance of the employees. She checks out the trays, visits the patients after each meal, and makes periodic ward rounds with the ward officer. On the gastro-intestinal and diabetic section the student is taught to write and figure diabetic menus and to determine carbohydrate substitutions for food not consumed on the diabetic tray. She teaches the diabetic patient how to write his diet and checks his results.

One month of the student's training is devoted to pediatrics. Long before we had students, the officers in charge of the obstetrical section asked that a dietitian take over the preparation of the babies' formulas. Eight months ago we met this need by organizing something new in Army hospitals—a milk formula laboratory as a separate unit. Two weeks are spent in this laboratory where the technique of proper cleanliness is taught. The student learns to wrap and autoclave her equipment, to mix, pour, and cap the formulas. She delivers the formulas to the nursery and feeds the babies twice daily. The student also affiliates for experience with older children where she writes menus, prepares the food, serves the trays and actually feeds the smaller children. During this assignment, the student participates in the well baby and prenatal clinics once a week and in the postnatal clinic 3 times a week.

At this point the student becomes an apprentice dietitian. As such she follows much the same routine in the administrative section but she is granted much more authority. For instance, she relieves the staff dietitian when off duty or on leave, and acts in a supervisory capacity on the wards where one staff dietitian is covering a number of wards. She is in charge of the milk formula laboratory, and does the postnatal clinic teaching. In fact, the apprentices do all the teaching in the very active training program for civilian mess and ward attendants, and they are doing an excellent job.

Now it seems that we are more than enthusiastic with the arrival of each new class, even though we know there will be many new problems to solve. For our horizon is being broadened in this wartime job in which our profession will gain in accordance with the service we render.

APPOINTMENTS AND PROMOTIONS, ARMY MEDICAL DEPARTMENT DIETITIANS

The following dietitians were appointed to the Army Medical Department in October:

Artz, Amelia Ellen: Madison Col., Harrisonburg, Va.; Cook County Hosp.
Biedermann, Mary Alice: Univ. of Minnesota; Texas State Col. for Women.
Brandner, Grace Louise: Kansas State Col.; Edward J. Meyer Mem. Hosp., N. Y.
Clooney, Anna Louise: Chestnut Hill Col., Penn.; Mayo G. H., Galesburg, Ill.
Davidson, Mary Louise: St. Benedicts Col., Minn.; Stanford Univ. Hosp.
Dryfoos, Helen Frances: Louisiana State Univ.
Dwyer, Mary Catherine: Col. of St. Catherine, St. Paul, Minn.; Iowa Univ. Hosp.
Fletcher, Mary Virginia: Virginia Polytechnic Inst.; S. H., Ft. Bragg.
Gaunt, Dorothy Wilson: Univ. of Washington; Pennsylvania Hosp.
Goldberg, Millicent: Ohio Univ., Athens; Lawson G. H., and S. H., Ft. Jackson.
Goldberg, Rae Ruth: Simmons Col.; Beth Israel Hosp., Boston.
Harper, Helen Louise: Purdue Univ.; Mayo G. H.
Henry, Charlotte Helen: Louisiana State Univ.; Fitzsimons G. H., and McCloskey G. H., Temple, Tex.
Jefferson, Patricia Mary: Regis Col., Weston, Mass.; Kennedy G. H., Tenn.
Jolley, Victoria Harria: Sam Houston State Teachers Col.
Jones, Marion Edythe: Hood Col., Frederick, Md.; Western Pennsylvania Hosp.
Kozeff, Mary Karp: Univ. of Connecticut; Fitzsimons G. H., S. H., Cp. Callan, Calif., and Hammond G. H., Calif.
Kreps, Sonya Florence: New York Univ.
Lager, V. Joanna: Univ. of Colorado; Seattle Course for Dietitians.
La Grave, Jeanne Beatrice: North Dakota Agric. Col.; Fitzsimons G. H., and S. H., Cp. Carson.
Long, Mary Elizabeth: Ohio State Univ.; Univ. of Minnesota Hosp.
Lopez-Molina, Dinorah: St. Joseph's Col., Md.; Kennedy G. H., Memphis.
Marshall, Elizabeth Constance: Univ. of Saskatchewan.
McInerney, Mary Teresa: Seton Hill Col., Penn.; Cook County Hosp.
Meng, Caroline Tandy: Univ. of Maryland; Cook County Hosp.
Radke, Margaret Eileen: Univ. of North Dakota; St. Mary's Hosp., Rochester, Minn.
Rosen, Alice: Hunter Col.; Fitzsimons G. H., and Valley Forge G. H.
Sanford, Ada Woodruff: Virginia Polytechnic Inst.; S. H., Ft. Bragg.
Shimp, Margaret Ella: Michigan State Col.; Cook County Hosp.
Spain, Dorothy: Montana State Col.; Massachusetts G. H.
Wallace, Phyllis Aleaine: Indiana Univ.; Cook County Hosp.

The following promotions for October were announced:

First Lieutenant to Captain

Anita D. Armour, R-184

Second Lieutenants to First Lieutenants

Norma R. Arnold, R-885
Constance L. Cockburn, R-927
Marian A. Irvine, R-1065
Agnes R. O'Donnel, R-1110
Flora V. Stephens, R-1046
Helen V. Wienman, R-790
Dorothy J. Wiltamuth, R-632

Book Reviews

Diseases of the Digestive System. Edited by Sidney A. Portis, M.D., F.A.C.P., Associate Professor of Medicine, University of Illinois Medical School. Philadelphia: Lea & Febiger, 1944. Cloth. Illustrated with 182 engravings. Pp. 932. Price $11.

Forty-eight authorities in the field of gastro-enterology and related fields have contributed to this book, in which due attention has been paid to the psychosomatic factors now known to be important in malconditions of the digestive tract. In fact, an entire chapter by a distinguished psychoanalyst, Dr. Franz Alexander, is devoted to psychogenic disturbances of the gastro-intestinal tract.

The book is divided into five parts. Part I covers the history of our knowledge of gastro-intestinal diseases and the anatomy of the gastro-intestinal tract, the interpretation of digestive tract pain, and the relation of teeth to gastro-intestinal diseases. Part II is concerned with the esophagus, stomach and duodenum; Part III, the liver, gallbladder, and pancreas; Part IV, the small and large intestine; Part V, dietary concepts; Part VI, gastro-intestinal manifestations of extra-abdominal and systemic diseases, including the relationship to the cardiovascular system, renal and urologic disease, allergies and endocrinologic manifestations, and to arthritis, gout, diabetes, and pellagra.

Every dietitian will welcome this book as an excellent and interesting reference, one which will be of material aid, particularly to the dietitian instructor, and the clinic and ward dietitian. Especially useful to the practising physician, and an all too unique feature in treatises on diseases, is Part V, on dietary concepts, written by a dietitian and director of one of the American Dietetic Association's approved training courses for dietitians, Dr. Kate Daum, who is also an instructor in a medical school. Her concise and intelligent outline of normal nutritive requirements, and discussion of the factors of acid-base relationships, residue, and vitamins, followed by specific directions for typical diets used in the therapy of digestive tract diseases, are in keeping with the consistently progressive and up-to-date character of the whole book.

Food for the Family. By Jennie S. Wilmot, M.A., and Margaret Q. Batjer, M.S. Second edition. Philadelphia: J. B. Lippincott Company, 1944. Cloth. Illustrated. Pp. 748. Price $3.25.

This book, which was developed in an elementary course in foods at the University of Texas, was revised with the needs of home economics majors and non-majors in mind and, in addition, "both the vast number of homemakers interested in learning more about food for their families and the many people who are concerned about sufficient food for an adequate diet for everyone." The authors state that the subject matter has been completely revised and rewritten in the light of the most recent developments in the field of nutrition and from the point of view of changes in food supply as brought about by the war. Much of the material has been expanded and reorganized, and a number of illustrations have been added. The laboratory problems and recipes have been entirely reset in order to make them more practical and more easily used both in class and in the home. Increased emphasis has been given to recipes of relatively low cost.

The most striking feature of this book is its clear exposition, which is enhanced by the excellent typography, both as to size and spacing of type and arrangement on the page. The organization of the text, which can only be the result of careful working and reworking of the material, is worthy of mention. Each chapter is divided into several subdivisions with appropriate subheads and questions interspersed. Laboratory problems, consisting of both cooking projects and experiments, appear, in most cases, at the end of each chapter preceding lists of references. Section 1 of the book is a general discussion of health, digestion, and food habits. Section 2 covers the home kitchen layout and equipment. Section 3 (comprising about 60 per cent of the text) is entitled "Food Selection and Preparation" and treats each type of food separately, concluding with a general chapter on preserving food. Section 4 includes a discussion of meal planning, with consideration for the problems related to occupation and activity of the members of the family, meal customs, season, aesthetic factors, etc. Tips on buying "for maximum nutritive value," "more food for less money," and "with safety and sanitation in mind" are listed, also pointers on food preparation to conserve maximum food value and increase nutritive value. Directions are given for preparing work plans in the home. As a laboratory problem students are asked to plan, prepare and serve one day's meals for a family of given composition. Discussions of table appointments and decorations, and entertaining in the home, accompanied by many fine illustrations, complete this final section. Special attention throughout the book is given to the needs of the college student and the discussion of table manners seems not amiss.

In its present form, this book appears to be almost ideal for an elementary elective course for students interested in foods from the point of view of homemaking, in addition to its usefulness for the other purposes which the authors suggest.

Your Weight . . . . Signpost to Health and Longer Life. By E. Neige Todhunter, Ph.D. University, Alabama: Department of Foods and Nutrition, University of Alabama, 1944. Paper. Pp. 11. Price 10 cents (except to residents of Alabama, to whom it is available free).

This booklet is the first published work from the department of which Dr. Todhunter is head. It is a simple exposition of the importance of weight control and includes general principles to be followed and specific directions for planning reducing diets. The booklet is written for the overweight, but by negative inference those who suffer from underweight can also derive some useful pointers, while the data for calculation of a suitable diet are pertinent to all. Stress is laid on adapting the regular "family menu" to personal needs, and including the protective foods in fairly constant amounts.

Family Food Consumption in the United States. Spring 1942. U. S. Department of Agriculture Miscellaneous Publication No. 550. Washington: Superintendent of Documents, U. S. Government Printing Office, 1944. Paper. Pp. 156. Price 20 cents.

This study, dealing with the food consumed at home by housekeeping families and single persons in the United States in the spring of 1942, forms part of the study of "Family Spending and Saving in Wartime" conducted by BHNHE and the U. S. Bureau of Labor Statistics in 1942. Much of the information has already been released for the administrative use of WFA, OPA, and other agencies.

The study, of course, represents a tremendous amount of work and the published report describes in detail how the survey was conducted and the many ramifications in estimating values for the country as a whole. A "rough estimate" was made of the proportion of families that had diets in the spring of 1942 which failed to meet the recommendations of the National Research Council, "by relating the average nutritive value of diets in that period to both the average nutritive value of diets in 1936 and the proportion of families that fell short of the recommended allowances in 1936" (as reported in the Consumer Purchases Study of 1936). The estimate shows that in the spring of 1942 "the diets of more than one half of the families still did not meet the recommended allowances for riboflavin and that the proportion of diets low in calcium had been reduced to less than a third; the proportion low in thiamine, to a fourth; and the proportion low in ascorbic acid, in which there was the greatest improvement, to less than a tenth. There was also a great reduction in the estimated proportion of families that had diets low in vitamin A value, iron, and protein—from about one fourth in the earlier period to about one tenth in the later period."

The study as here reported, however, is probably of more interest from the point of view of the method used and some of the tabulated food consumption figures. A food composition table, entitled "Nutritive Value of One Pound of Food Materials," was prepared for computing the nutritive values of family diets in the study, based on values in other compilations, original data in the literature, and results of analyses made in the laboratories of BHNHE. It is stated that as more data on the composition of different foods become available, many of the values presented here, particularly those for vitamins, may need revision, but that since detailed data on consumption of foods are included in this report it will be possible for one to estimate how the use of different values might affect the averages given.

In view of the fact that reports of the Bureau of Agricultural Economics concerning food consumption in the United States are customarily reported in terms of "disappearance" data (statistics of production, imports, exports, and stocks on hand at the beginning and end of a given year), the discussion of the agreement, or lack of agreement in certain cases, between the data from dietary surveys reported in this study and the BAE figures is worth noting. Following this discussion we read that "When food consumption data from the two sources are reduced to measurements of nutritive value, there is remarkably close agreement between the evaluation based on dietary surveys and that from estimates of 'disappearance.' This is particularly true in the 1936 comparison in which the factor of seasonality does not play a part."

Current Literature

Contributed by Helen Baughman, Janet Engebretsen, and Hilda McEwen, Dietary Department, Johns Hopkins Hospital, Baltimore; Quindara Oliver Dodge, School of Home Economics, Simmons College, and Women's Educational and Industrial Union, Boston; and the Journal Staff.

AMERICAN JOURNAL OF DIGESTIVE DISEASES

Vol. 11, September 1944

*Enzyme treated milk in the dietary management of patients with peptic ulcer. F. Steigmann and M. L. Blatt.—p. 276.

Treatment of Peptic Ulcer. In many instances of peptic ulcer ordinary pasteurized milk is not well tolerated and modified milks must be substituted. A recently introduced enzyme-treated milk, Enzylac, possesses the same nutritive value and mineral content as pasteurized milk and has an added advantage in that it causes a higher combined and a lower free acidity, while softer and more friable curds result from its ingestion which are expelled more easily from the stomach than the tougher curds of ordinary milk.

AMERICAN JOURNAL OF MEDICAL SCIENCES

Vol. 208, September 1944

*Time activity of globin insulin with clinical applications. H. E. Martin, D. G. Simonsen and N. H. Homann.—p. 321.

*Vitamin deficiency as an epidemiologic principle. W. L. Aycock and G. E. Lutman. —p. 389.

Globin Insulin. Total duration of action and activity per hour are important in studying any new insulin. A majority of patients on globin insulin showed a prolonged action (18 hr. or more) and a peak action between 6 and 10 hr. In regulating patients on globin, a light breakfast, lunch, afternoon nourishment, dinner and a bedtime feeding are advisable with a carbohydrate division such as: $\frac{1}{6}$, $\frac{1}{3}$, $\frac{1}{6}$, $\frac{1}{3}$, plus evening feeding. The advantages of globin insulin are: mixing of insulins is avoided, allergic and local reactions are minimized, and nocturnal activity is reduced. It cannot be prescribed for all diabetics because some find afternoon nourishment impractical, severe diabetes cannot be controlled on one dose of globin, and burning sensations on injection are felt by a few.

Vitamin Deficiency. Evidence is produced to show that a number of dietary deficiencies have this effect—a marked increase in natural resistance to several virus infections, rather than a lowered natural resistance to bacterial infections. Historical records have coupled "famine and disease" for centuries; recently xerophthalmia has been thought more prevalent in vitamin deficient subjects. Investigators now believe pestilence follows famine due to a breakdown of sanitation rather than starvation; and xerophthalmia is not an epidemic infectious disease but a local reaction. The authors hope to have discouraged unlimited dosing of vitamin concentrates as a means of curing every disease.

AMERICAN JOURNAL OF PHYSIOLOGY

Vol. 142, September 1944

*The blood picture of iron and copper deficiency in the rabbit. S. E. Smith, M. Medlicott and G. H. Ellis.—p. 179.

*Hemolytic depression of the erythrocyte number by feeding of fat with choline. J. E. Davis.—p. 213.

*Work in the heat as affected by intake of water, salt and glucose. G. C. Pitts, R. E. Johnson and F. C. Consolazio.—p. 253.

*The effect of vitamins of the B complex on the work output of perfused frog muscles. N. W. Shock and W. H. Sebrell.—p. 265.

*The effect of changes in concentration of pantothenate on the work output of perfused frog muscles. N. W. Shock and W. H. Sebrell.—p. 274.

Iron and Copper Deficiency Anemias. A deficiency of iron or copper or both in the diet produces a microcytic and hypochromic anemia in the rabbit.

Depression of Erythrocyte Number by Choline. Daily oral administration of 60 gm. lard and 10 mg. per kg. of choline hydrochloride to four normal dogs caused rapid, significant reductions in their erythrocyte counts and hemoglobin percentages. Icterus indices were significantly elevated concomitantly. Discontinuation of fat feeding alone, or of both fat and choline administration resulted in rapid returns of erythrocyte numbers to normal. These results are interpreted by assuming that the choline acts as a brake on the bone marrow in preventing any great acceleration of erythropoiesis, while the fat furnishes hemolytic agents which increase red cell destruction.

Work Output in Hot Environment. The best results in fully acclimatized young men on a good daily diet, performing intermittent hard work in the heat, are achieved by replacing hour by hour the water lost in sweat. Any amount of water considerably less than this leads in a matter of hours to serious inefficiency and eventually to exhaustion. Replacement of salt, hour by hour, under such circumstances has no demonstrable advantage. Administration of glucose is of little if any advantage when compared with the great benefit of large amounts of water. When practical problems of transportation and supply, lack of appreciation of the importance of water and salt, or the anorexia so common in hot environments, interfere with adequate intake, it may become desirable to supply salt in the drinking water, or less satisfactorily, in the form of tablets.

B Vitamins and Work Output. The total work output of the frog gastrocnemius muscle was significantly increased by thiamin and calcium pantothenate. An increased work output was observed with nicotinic acid amide and pyridoxine, but the increase was not statistically significant. A significantly greater work output was observed during the final stages of fatigue with the addition of nicotinic acid amide and pyridoxine as well as with thiamin and calcium pantothenate. No increase in work output was observed with riboflavin.

Pantothenate and Work Output. The addition of calcium pantothenate to the perfusion fluid improved the work output of frog muscles. This improvement increased with increasing concentrations of pantothenate from 0.001 to 0.01 meq. per liter. Sodium pantothenate was also effective in increasing work output.

ANNALS OF INTERNAL MEDICINE

Vol. 21, September 1944

*Subclinical vitamin deficiency. The assay of subclinical thiamin deficiency. M. C. Hulse, N. Weissman, E. Stolz, M. Clinton and J. W. Ferrebee.—p. 440.

Subclinical Thiamin Deficiency. Studies on 6 normal subjects were made to determine the extent of change in extracellular or intracellular thiamin concentrations in subclinical thiamin deficiency. Diets of less than 0.2 mg. thiamin were provided; almost from the first day subjects complained of the monotony of the diet. After 2 weeks, they felt and looked dispirited; in the next 2 days, 2 subjects received 2 mg. thiamin and experienced a feeling of well-being in 18 hr. By laboratory assay, subclinical symptoms of thiamin deficiency were found in the 18-day period of deprivation. The urinary excretion of thiamin decreased; a decrease was noted in the yeast-stimulating activity of samples of plasma and of skeletal muscles, and an impaired ability to metabolize pyruvate.

ARCHIVES OF PEDIATRICS

Vol. 61, August 1944

*The nutritional basis of child growth and development. I. N. Kugelmass.—p. 413.

Vol. 61, September 1944

*The nutritional basis of child growth and development (Conclusion). I. N. Kugelmass.—p. 464.

Child Growth and Development. This comprehensive article answers the question, What constitutes growth? discussed under the following: physical course of growth, course and composition of growth, prenatal growth, postnatal growth, mathematical basis for growth, nervous tissue, neural composition, neural nutrition, bone, muscle, skin, and blood.

BRITISH MEDICAL ASSOCIATION JOURNAL

No. 4366, September 9, 1944

*Nutritional iron deficiency anaemia in wartime. Part III. The haemoglobin levels of school children and pregnant women in 1944, compared with the levels in 1942 and 1943. L. S. P. Davidson, G. M. M. Donaldson, S. T. Lindsay and M. H. Roscoe.—p. 333.

*Carotinaemia and hypervitaminosis A. Editorial.—p. 345.

No. 4367, September 16, 1944

*Proteolysed beef in the treatment of coeliac disease. A. C. Adamson and D. Lewis. —p. 371.

*A survey of the haemoglobin levels of the poor classes in Aberdeen. H. W. Fullerton, M. I. Mair and P. Unsworth.—p. 373.

Tests of liver function. Editorial.—p. 378.

Iron Deficiency Anemia. A survey of the hemoglobin of school children and pregnant women, made in Edinburgh during the past 2 years, has shown a progressive rise in the mean hemoglobin levels of these two sections of the population. The cause is discussed, and evidence presented that the introduction of national wheatmeal flour has been an important contributing factor.

Carotenemia and Hypervitaminosis A. An abnormal intake of carotene is relatively harmless, yet the vitamin itself gives rise to toxic symptoms. It is not the total amount of vitamin A stored

that determines the onset of toxic symptoms but the presence of quantities large enough to overwhelm the capacity of the liver to remove it from the blood. It is apparently possible to raise the storage in the liver to high levels, and no symptoms of intoxication follow unless the daily consumption is raised above the "toxic" level. There is no danger of clinical hypervitaminosis A, if vitamin A, or concentrates containing it, are prescribed in therapeutic doses. Josephs reported toxic symptoms in a patient receiving 240,000 I. U. daily for 3 years as compared to 1500 I.U. for the infant and 8000 I.U. for the nursing mother.

Proteolyzed Beef for Celiac Disease. A method for ensuring a high protein nitrogen intake in the treatment of celiac disease and allied conditions by the oral administration of proteolyzed beef is described. The advantages of proteolyzed beef are many: it yields in concentrated solution first class protein in the form of easily digested and assimilable peptones, polypeptides, and amino acids; 20 oz., the equivalent of 1 lb. beef a day, can be taken by a young child over an indefinite period; the taste, not unpleasant, resembles broth and the preparation of the digest can be carried out in any hospital possessing a well-equipped dispensary.

Hemoglobin Levels. Hemoglobin estimations in 1177 subjects belonging to the poor classes in Aberdeen have been compared with the results of a similar survey carried out in 1935. The incidence of anemia in young children and in pregnant women, less in 1943 than in 1935, was greater in girls between the ages of 15 and 19. No significant difference was found in adolescent and adult males.

BULLETIN OF THE JOHNS HOPKINS HOSPITAL

Vol. 75, August 1944

*Riboflavin deficiency in swine. With special reference to the occurrence of cataracts. M. M. Wintrobe, W. Buschke, R. H. Follis, Jr., and S. Humphreys.—p. 102.

Riboflavin Deficiency. Pigs maintained on riboflavin-deficient diets react similarly to dogs and monkeys, showing rough, thin, dry coats, growth impairment, normocytic anemia, abnormal gait, and cataracts. Other vitamin B-deficient diets produced no eye changes.

HOSPITALS

Vol. 18, July 1944

*Tempering the dietary budget by use of controls. T. Terrell.—p. 45.
*Train employees to reduce needless waste. M. S. Frank.—p. 69.

Vol. 18, August 1944

*Labor turnover factors that affect the food service department. M. M. Harrington —p. 61.

Dietary Budget. If the budget is sufficient and flexible, then it is the responsibility of the dietitian to prepare and deliver good food, but otherwise the serving of poor food is the fault of the administration. The objective of the dietary department should be good food and good food service, prepared and delivered in the most economical way. Waste in the dietary department may influence many hospital administrators in placing the dietary department on a strict budget. Waste should be eliminated and sound controls maintained for the dietitian's guidance, including a definite salary schedule with a minimum and maximum for each job based on the prevailing wage scale, a definite and fair personnel program, a maximum total on inventories, a definite plan of purchasing, and an established routine for the preparation and delivery of food. To establish a workable salary schedule, job specifications and analysis are necessary. It has been proved many times that the employing of additional personnel may cut the expenses of such a department as the dietary. The hospital which serves good food has at its command the best medium for ethical advertisement.

Conservation. A program of employee education in sound conservation practices can prevent much of certain types of waste. Employment of a man to sort waste will return his salary many times in the value of the articles recovered and reclaimed. Additional reclamation of supplies can be accomplished by providing, in the terms of the contract with the collector of garbage and swill, for the return of all hospital property which may be removed with this refuse. A surprisingly large number of waste materials are marketable and the aggregate sum realized from their sale over a period of years is substantial. Such marketable waste materials include grease, fat and bones, garbage and swill, x-ray films, bags, tin cans, metal drums, old furniture, baskets, barrels, and scrap paper.

Labor Turnover Factors. This graphic picture of the labor problems of the last few years shows the effects of social and economic changes in the community. Employee turnover is costly not only in decreased efficiency but in total payroll, and standards of service cannot be maintained at a previous level. Wages are a serious consideration in labor turnover. Increase in wages had some slight effect in rate of turnover among unskilled employees. The ratio of employees to meals served showed a decreased efficiency but as a result the number of employees now working split time has been reduced to 21.9%.

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 126, October 7, 1944

*Role of the general practitioner: Chairman's address. J. C. Bowman.—p. 331.
*The biosynthesis of riboflavin in man. V. A. Najjar, G. A. Johns, G. C. Medairy, G. Fleischmann and L. E. Holt, Jr.—p. 357.
The Red Cross medical committee. Current comment.—p. 371.

Vol. 126, October 14, 1944

*The medical treatment of psychosomatic disturbances with special reference to the gastrointestinal tract and fatigue. S. A. Portis.—p. 413.
*Allergic headache: An unusual case of milk sensitivity. T. G. Randolph.—p. 430.
*Fortification of milk with vitamins and minerals. Council on Foods and Nutrition. —p. 432.
*American Public Health Association health insurance declaration. Editorial.—p. 434.

The General Practitioner. "Health is not negative. Health means more than simply keeping out of a physician's office. It is a positive condition of the body which gives us a long life of zest and buoyancy....Medical research made one of its greatest contributions to human welfare when it began to produce positive evidence that improper or inadequate food, and a consequent state of poor nutrition, is the underlying cause of many diseases." Sound nutrition and proper eating must become popular through education. Psychosomatic medicine is a new name for the use of sound judgment and intelligent understanding of life that has always characterized the work of a good general practitioner.

Biosynthesis of Riboflavin. It is clearly established that microorganisms present in the rumen of ruminant animals will synthesize riboflavin in quantities sufficient to supply the requirements for this factor. Biosynthesis of riboflavin has also been demonstrated in the cecum of the rat, but in this omnivorous animal the phenomenon is conditioned by the diet, and only under particular conditions is it sufficient to furnish the requirements. Although it seems reasonably clear that riboflavin deficiency does occur in man, it is by no means clear that it always develops whenever the diet is deficient in riboflavin. The possibility that under given dietary conditions the intestinal bacteria of man might synthesize riboflavin, providing protection against deficiency, has never been evaluated. The present report describes experiments which demonstrate clearly the biosynthesis of riboflavin in the human intestinal tract—and in considerable quantities. Twelve subjects, placed on an experimental diet of purified vitamin-free foods, in which only supplements of pure vitamins were given, subsisted for a period of 12 weeks on a diet containing between 60 and 90 mcg. riboflavin per day. An attempt to inhibit the biosynthesis of riboflavin by the intestinal bacteria, by the administration of succinylsulfathiazole for a period of 4 weeks, met with no success. The conclusion is drawn that riboflavin may not be a dietary essential under all conditions. The conditions in which it may be effectively synthesized in the intestine remain to be defined.

Psychosomatic Disturbances. Four basic considerations confront the physician in the medical treatment of these patients: (1) A dietary regimen should be constructed to take into consideration the irritability of the mucous lining of the digestive tract resulting from this pathologic physiology, the prevention of reflex phenomenon due to stimulation of various foods, the adequate vitamin and mineral contents, and finally rapid return to near normal of body metabolism. (2) If altered emotional stimuli may result from the cortical influence on the midbrain, the medication should be directed at either the eradication or the removal of this influence. Simply stated, emotional stimuli produce disturbed function; disturbed function ultimately results in pathologic change. The treatment of pathologic change may be medical or surgical, but the fundamental etiologic approach and prevention of recurrence depends on a study and normalization of the emotional status. Emotionally disturbed patients may have fatigue which may result in a disturbance of their carbohydrate metabolism. Gastro-intestinal symptoms are in a majority of instances due to disturbed physiology resulting from altered emotional stimuli.

Allergic Headache. A case of allergic headache of unusual severity associated with fatigue and a state of altered consciousness resulting from sensitization to milk illustrates many of the pitfalls in the recognition and specific diagnosis of allergic head pain.

Fortification of Milk. It is concluded that the fortification of milk with vitamin A, thiamin, riboflavin, niacin, iron and iodine or any one of these materials does not serve a public health need sufficiently to warrant Council acceptance of the fortified product.

Health Insurance. At its annual meeting in New York, October 4, the Governing Council of the American Public Health Association adopted a report favoring in effect a federal plan of compulsory health insurance. The proposed medical service would be supported by social insurance, supplemented by general taxation, or by general taxation alone.

JOURNAL OF BIOLOGICAL CHEMISTRY

Vol. 155, September 1944

*The influence of supplementary casein, cystine, and methionine on liver lipid content of adult rats. M. G. Horning and H. C. Eckstein.—p. 49.

*A difference in the metabolism of *l*- and *dl*-tryptophane in the human. A. A. Albanese and J. E. Frankston.—p. 101.
*Chemical determination of pyridoxine in biological materials and pharmaceutical products. The multiple nature of vitamin B_6. M. Hochberg, D. Melnick and B. L. Oser.—p. 119.
*On the stability of pyridoxine. M. Hochberg, D. Melnick and B. L. Oser.—p. 129.
*Mechanism of production of vitamin K deficiency in rats by sulfonamides. A. Kornberg, F. S. Daft and W. H. Sebrell.—p. 193.
*Studies in carbohydrate metabolism. I. The rate of turnover of liver and carcass glycogen, studied with the aid of deuterium. D. Stetten, Jr., and G. E. Boxer.—p. 231.
*Water-soluble vitamins in hair as influenced by diet. L. J. Novak and O. Bergeim.—p. 283.

Amino Acids and Liver Fat. In experiments with adult male rats a basal diet containing 5% casein was, so far as lipotropic action is concerned, just as effective when supplemented with methionine and cystine as when supplemented with sufficient amounts of cystine and casein to equalize the content of the 2 sulfur-containing amino acids in the 2 diets. When the basal diet was supplemented with casein, the protein content was increased from 5 to 20% in some instances and from 5 to 25% in others. Evidently the 4 and 5-fold increases in dietary amino acids other than cystine and methionine were without influence on liver lipid content and it is concluded that in these adult rats the effects of the diets on liver lipid content may be explained entirely by their content of cystine and methionine.

Tryptophane Metabolism. It has been observed that the metabolism of the *d* component of *dl*-tryptophane differs from that of the *l* component in the human. The study suggests that the biological value of *dl*-tryptophane is approximately one half that of *l*-tryptophane.

Determination of Pyridoxine. Chemical, microbiological, and biological data are presented indicating that pyridoxine is not the only compound in nature possessing vitamin B_6 activity for the rat and for micro-organisms. An abbreviated, reliable procedure is given for the chemical determination of pyridoxine in pharmaceutical products.

Stability of Pyridoxine. Pyridoxine is stable in mixed vitamin preparations subjected to accelerated storage tests, to the same degree as riboflavin and nicotinic acid.

Sulfonamide Effect on Vitamin K. These findings together with other available data indicate that the inhibition of intestinal bacterial synthesis of vitamin K is the dominant factor in the production of vitamin K deficiency in rats by the sulfonamides used in these studies.

Carbohydrate Metabolism. On the high-carbohydrate diet employed, only about 3% of the dietary glucose was handled by way of glycogen and at least 10 times as much of the dietary glucose was used to synthesize fatty acids as was used to synthesize glycogen. Evidence is presented that both liver and carcass glycogen are formed in part from dietary glucose and in part from smaller units.

The appearance of deuterium in glycogen proves to be a very much more rapid process in the fasted than in the well-nourished rat. Previous fasting favors a process of glycogenesis in response to ingested glucose that results in glycogen rich in isotope. This is interpreted as indicating glycogenesis from fragments smaller than hexose rather than from dietary glucose directly.

Water-Soluble Vitamins in Hair. Riboflavin, nicotinic acid, pantothenic acid, and inositol are found in normal rat and human hair in about the same ratio to each other as in other tissues. Human hair has a lower content of the vitamins than rat hair. The vitamin content of rat hair may be influenced by the diet. Low values for pantothenic acid were found on the vitamin-deficient diets and addition of pantothenic acid to such diets resulted in normal values for this vitamin. There is some evidence that choline or pyridoxine may lower the inositol content of hair in the rat. Low inositol values were observed in human hair in certain cases of baldness. Further studies are necessary to establish the significance of these findings.

JOURNAL OF PEDIATRICS

Vol. 25, September 1944

*Congenital and infantile beriberi. D. W. Van Gelder and F. U. Darby.—p. 226.
*Studies of the nutritional state of children in Unoccupied France in the fall of 1942. A preliminary report. H. C. Stuart.—p. 257.

Congenital Beriberi. A brief review of the literature on congenital and infantile beriberi with a description of thiamin deficiency states in infants includes a case report of congenital beriberi. Urinary assays and dextrose, pyruvate and lactate blood levels, fasting, and following ingestion of dextrose, indicated a state of thiamin deficiency in the mother. Infants with large hearts in whom no valvular or congenital lesion can be demonstrated should be given large parenteral doses of thiamin hydrochloride as a therapeutic test. During pregnancy and lactation a mother should be provided with an adequate intake of vitamin B. If the maternal diet is suboptimal, the nursing infant should receive additional vitamin B_1 until such time as other foods containing this vitamin are introduced.

Undernutrition in Children. A state of general, moderate to marked undernutrition was widespread in Unoccupied France in the fall of 1942, at least among children over 10 years. There was little evidence that this undernutrition had generally reached a stage in which health had been profoundly affected, life endangered, or development more than moderately retarded. Under these circumstances the supplement of 250 gm. milk daily which the American Red Cross was planning to give in most instances to children between 10 and 14 years of age would be most helpful. It was not sufficient to meet all the inadequacies in their diets and failed by a wide margin to correct the deficiency in calories for the older children, but it would serve as a valuable protection against the more serious consequences of the food situation which then existed.

MEDICAL OFFICER

No. 1877, July 15, 1944

*The principles and practice of food education. Lord Horder.—p. 21.

Food Education. We have a body of nutrition facts ready for application and there is a compelling duty laid upon us to apply them. Making health-giving foods available for all does not correct the habits of three generations, habits which, though originally the result of economic conditions, to a large extent have become pleasant and fixed very early in life. Education is necessary, and not only for the poor, and should include instruction in marketing, food values, cooking, and methods of preservation. This balancing of the diet is sometimes carried too far. To balance the day's food is not a bad idea, but to balance the individual meal is not necessary. We should always aim to teach a little less than we think we know. It is highly probable that many natural foods contain nutrients perhaps at present unknown to us, and this should warn us against tinkering too much with food. This probably has an important bearing upon the vexed problem of bread. The Food Education Society has proved itself a useful open forum for the discussion of all aspects of food and nutrition. The Society's best and most profitable work still lies in the field of actual happenings: food production, preservation, distribution, preparation, and consumption.

NEW ENGLAND JOURNAL OF MEDICINE

Vol. 231, August 3, 1944

*Vitamin B deficiency in private practice. D. Merrill.—p. 174.

Vitamin B Deficiency. Eight cases are reported emphasizing the frequency with which this group of diseases occurs as a complication of many serious illnesses seen in everyday practice. The precipitating factors in this small series were fever, a bizarre diet, chronic diarrhea, poor teeth or poorly fitting dentures, preoperative apprehension, infusions of glucose solution, hard manual labor, obesity, drug addiction, diets rich in starch, and sore throat or sore mouth. In any given case there was usually more than one factor. It may be repeated that symptoms of vitamin B deficiency may develop whenever an elevated metabolism occurs simultaneously with a deficiency of vitamin B-containing substances in the diet or any interference with absorption from the gastrointestinal tract, as cases of fever, increased caloric intake, increased muscular activity, hyperthyroidism, chronic diarrhea or vomiting and the like, with or without obvious limitation of intake or absorption of vitamin B-containing foods.

PUBLIC HEALTH NURSING

Vol. 36, September 1944

*The changing school health program. Report of Conference of School Nursing Section.—p. 478.

School Health Program. Improvement in health is basic in all home economics teaching, whether it be foods, clothing, housing, child care or family relationships. The home economist has a great contribution to make to the health of the school child through the school lunch. Too often the school lunch is considered only as a feeding program, with emphasis on the adequacy of the meal or the total day's meals and the educational implications are missed. One of the reasons why the students don't eat the food served to them is because they do not participate in planning and preparing it. There is still much to be done in finding ways in which students can participate.

SCIENCE

Vol. 100, September 1, 1944

*Item. Science news.—p. 10.

Vol. 100, September 15, 1944

*Ascorbic and dehydroascorbic acid in cooked garden beets. E. Kelly and F. W. Christensen.—p. 248.
*Botany and agriculture in the USSR. Science news.—p. 10.

Vol. 100, September 22, 1944

*The effect of cocarboxylase on the conversion of fat to carbohydrate. L. E. Edwards.—p. 268.

*Absence of glucose effect on gastro-intestinal phosphate absorption. J. H. Perryman, R. de la Madrid and S. C. Brooks.—p. 271.

Vol. 100, September 29, 1944

*Production of vitamin C in the USSR. Science news.—p. 10.

Broccoli-Fed Chickens. Broccoli leaves, dried and ground into meal, have been found to be an excellent addition to chicken feed mash, in tests at the U. S. Department of Agriculture. Leaf meals of broccoli, Lima bean, carrot, turnip and pea were made up and of these, broccoli proved to be the best, showing high vitamin content and a percentage of protein substantially higher than that of alfalfa meal. Flavor of the meat of broccoli-fed chickens is stated to be definitely improved.

Ascorbic Acid and Dehydro-ascorbic Acid in Cooked Beets. Differences in relative amounts of reduced and dehydro-ascorbic acids in fresh and stored beets indicate a considerable change of ascorbic acid to the dehydro-ascorbic form during storage, without any appreciable destruction. The full vitamin C value is not shown by determining only the reduced ascorbic acid.

Botany and Agriculture. Plant scientists in the USSR are hard at work at the double task of establishing agriculture, forestry and botanical research in areas newly liberated from German occupation and preparing for future working programs for the postwar period. They are pursuing breeding and selection programs looking toward the development of better crops for cold, short-season regions. New methods have brought about potato production of about 12 tons to the acre in large-scale fields. Much attention is being paid to the production of hardy fruit trees and bushes, and to the adaptation of local wild species to food and medicinal purposes.

Cocarboxylase in Conversion of Fat to Carbohydrate. The formation of fat from carbohydrate is demonstrated. The course of the conversion is from aceto-acetic acid to citric acid, or another member of the cycle, and thence to glucose. The action of cocarboxylase probably is a complicated one, but its use in the depancreatized dog clarifies the principal steps by which the conversion proceeds. Doubtless the same reactions occur in the normal subject fed high-fat diets, but because insulin is present the glucose formed is for the most part immediately oxidized and therefore no change in R. Q., or at most very small changes, are detectable.

Glucose Effect on Phosphate Absorption. It is tentatively concluded that the presence and the presumable absorption of glucose have no important effect on the permeability of gastro-intestinal cells to phosphate.

Production of Vitamin C. Unripe walnuts have taken first place in the table of raw materials containing vitamin C. The vitamin C content of lemons, oranges, and tangerines is between one fortieth and one fiftieth that of Zakatalsk nuts (walnuts of the Zakatalsk forest). An unbearably bitter juice concentrate is prepared from the nuts by a simple process. A second process has been worked out whereby the bitter juice of the nuts is refined and the taste made more palatable. This new source of vitamin C is used chiefly in hospitals and military units.

WAR MEDICINE

Vol. 5, June 1944

*Nutritional disorders in Japanese internment camps. W. H. Adolph, A. V. Greaves, J. C. Lawney and H. L. Robinson.—p. 349.

Nutritional Disorders in Japanese Camps. Rations supplied to internees in the Far East are generally low in calories and proteins and deficient in calcium and vitamins, and serious losses in weight and vigor result. Easy fatigue, muscular weakness, and low blood pressures are generally prevalent. The factor of acceptability in the diet is an item of importance; the ill effects of lack of appetite are serious. Internees have found it extremely difficult to adjust themselves to a monotonous, low-calorie diet, high in roughage and low in protective foods. Beriberi and the symptoms due to insufficiency of the vitamin B complex have been the most prominent of the nutritional disorders encountered. Other nutritional diseases appeared more commonly after 6 months. An important nutritional disease affecting the eyes, apparently of neuritic origin, occurred in several camps. Treatment with fresh yeast in one of the camps produced slow but progressive and definite improvement. Diarrhea, reported in most camps, was an important cause of morbidity in some. Frank pellagra occurred in one camp and symptoms referable to the early stages of the disease in another.

AMERICAN RESTAURANT MAGAZINE

Vol. 28, July 1944

*"Round the clock service." Editorial.—p. 32.
*Diamonds for restaurants. J. W. Stokes.—p. 46.

Telephone Company Cafeteria. The Southern California Telephone Company employees' cafeteria operates on a "round the clock" policy. From 3 to 5 entrées, 4 or 5 vegetables, salads, and cake, pie, and ice cream are provided. None of the dining rooms has waitress service; employees carry their dishes to the soiled-dish counter after eating. Leftovers are usually reduced to a minimum as all cooking is done in small quantities. The organization has no chef; cooks are all women who have had no experience in institutional feeding, only in small-quantity cookery. A physical inventory of food on hand is taken monthly.

Employees. Provision should be made so that workers may find recognition in their jobs. Morale of employees emotionally upset constantly needs attention. Since there are always leaders, even in informal groups, executives who get to know them and obtain their cooperation will definitely increase morale. There are unlimited possibilities of utilizing these natural leaders as foremen or supervisors.

BAKER'S HELPER

Vol. 82, July 1, 1944

*Practical wartime shortcuts to profit production. C. C. Swearingen.—p. 26.
*There is no substitute for quality. A. E. Holden.—p. 32.

Vol. 82, July 29, 1944

*"What the housewives of America think about bread."—p. 25.
Don't mistreat wooden barrels.—p. 30.
*How to store supplies and equipment.—p. 34.
Using soya flour in modern versions of popular cookies. W. E. Broeg.—p. 48.

Vol. 82, August 12, 1944

*Some trends to study in the bakery business. W. A. Schmidt.—p. 28.
G. I. bakeries in Britain. L. Harap.—p. 30.
Production shortcuts through prepared mixes. W. E. Broeg.—p. 44.
*A simple way to load a divider. H. M. Bachman.—p. 52.

Bakery Short-cuts. Manpower is saved by greasing molded loaves of bread before they are put into pans, thus eliminating pan greasing. This may be done by one of three methods; lard oil, corn oil, or a combination of the two, give best results. Bun dough has a tendency to flow in pans if 5% of the water and the shortening are added during the last 2 minutes of mixing. Although twisted loaves are no longer allowed, improvements may be made in the round-top loaf.

Pies. In selling pies the important factors are tender, flaky crusts with a thick and fresh filling, and an interesting and descriptive name for each item.

Bread Survey. A nationwide survey over a 2-year period shows that 97% or 20 million city families buy bakers' bread; 84% use it exclusively. Nationally, each week low-income groups eat 7 loaves per family, middle-income groups 6 loaves per family, and prosperous families 5 loaves. Foreign-born white families show highest consumption of 8 loaves a week; native white families, 6 loaves; and Negro families, 5 loaves. About 37% of city families eat most bread "at night," 33% most at breakfast, 23% most at noon. The survey shows that 88% of urban families buy white bread regularly, 29% buy whole wheat, 15% buy rye, and 9% cracked wheat. Chief reasons for buying bakers' bread were its convenience, less than 5% giving quality, wholesomeness, healthfulness, food value, or economy as reasons; 11% thought it too heavy or doughy; 7% too light; 6% lacking in flavor; while 6% claimed that it dries out quickly. American housewives (80%) realized that bread is enriched, though their ideas about enrichment were vague.

Storing Supplies. Bakery supplies keep best when stored in totally dark, dry, well-ventilated rooms. Time and supplies are conserved by orderly storage. A good plan is to keep in the storeroom an inventory with the exact bin or shelf number recorded. The useful life of equipment, too, is shortened by moving from one storage spot to another. Nothing should be put directly on the floor. Wooden runners on the floor protect large articles, too heavy to store on shelves, from moisture or vermin. Plenty of artificial light is essential to facilitate locating articles and to prevent accidents. A light switch outside the storeroom with a small red bulb indicator is ideal. Be prepared for fires.

Trends. Women have taken over the baker's job and even improved some of the methods. After the war, however, men will take back most of their old jobs. Some small bakers have started using their own brand names to hold their trade after the war. Some bakers exchange products; one bakes the Swedish, the other, the Italian breads. Deliveries will be made more economically after the war with as much as 25% saved by intelligent routing. Bakers may branch out into hot vegetable and meat pies.

Automatic Divider Loading. Bakers who cut the dough piece by piece and throw it up into the hopper of the divider or scaling machine are doing the job the hard way. An automatic trough hoist is easy to install and shortens hours of production. Detailed drawings to scale are given.

BUILDINGS AND BUILDING MANAGEMENT

Vol. 44, August 1944

*Are wartime short-cuts setting new patterns for post-war cleaning? R. E. Thomas.—p. 19.
*Preventing employee accidents through better planning. H. D. Spear.—p. 24.
*How to fight fires effectively.—p. 26.
Two ideas for your modernization scrapbook.—p. 27.
*Longer life from your heating plant. N. J. Radder.—p. 28.
Pointed paragraphs on fluorescent lighting. F. V. Faulhaber.—p. 47.

Cleaning Short Cuts. Excellent summary by an experienced building manager points out possible postwar cleaning changes. Removable windows will lessen hazards of window-washing. Now contractors wash windows every 30 days at about one third reduction in rate, compared to prewar days when building managers had their own men do the job. Another change which may prove lasting is sending venetian blinds out for cleaning. A nonskid, no-buffing floor wax requires less expensive supplemental treatment to keep up luster. Wax on asphalt tile has to be removed only once in 18 months compared to the old once-a-month method. Public areas are cleaned every other day now with new fixtures and new chemicals for sterilization. A "blitz crew" of three or four is hired to do leftover jobs due to absenteeism or unusual situations.

Preventing Accidents. Seventy-five per cent of labor consists of lifting, carrying, pushing, and pulling heavy objects. The numerous strains, sprains, and hernia which result could be lessened by education in handling the loads and using mechanical aids. Falls may be prevented by having plenty of light, eliminating slippery floors, and providing ladders for climbing. In all safety programs, one must first analyze the causes of accidents, then take action to eliminate these, and supervise to be sure instructions are understood and carried out.

Fires. Fires in wood, paper, textiles, or electrical equipment should be fought by aiming the extinguisher stream at the base of the material which is burning, not the smoke and flames. When electricity is involved, the current should be shut off first. For liquid fires, either in containers or spilled, a foam vaporizing liquid or loaded stream extinguisher should be aimed against the far inside wall of the container above the burning surface to avoid spreading the fire. The extinguisher may also be directed high and allowed to fall lightly on the burning surface. If a carbon dioxide extinguisher is used, optimum results are obtained by directing the discharge as close to the burning surface as possible, progressing from near the operator forward and continuing, even after the flames have disappeared, to cool the liquid.

Boilers. Boilers should be drained and cooled at the beginning of summer, and cleaned by chemical methods. Soda ash and phosphate with excess alkali are effective. A careful inspection and repair should follow and the mechanical stoker overhauled. Welded repairs should be made when possible. After repairs are made a small fire of coke, charcoal, or gas should be burned long enough to dry all parts completely. Unslaked lime can be put in openings to steam space to absorb moisture. The best load for a boiler should be established and adhered to closely.

FOOD INDUSTRIES

Vol. 16, July 1944

Microorganisms can convert waste materials into food. F. J. Weiss.—p. 68.
*Milk can be frozen for sale to consumers. F. J. Doan and J. G. Leeder.—p. 76.
Freezing provides an answer to sweet potato problem. J. G. Woodroof and I. S. Atkinson.—p. 79.
New facts about packaging and storing dehydrated foods. Part VI.—p. 86.
*Soya butter.—p. 96.
*Sweet potato products.—p. 96.
*Two new products.—p. 96.
*Dry cheese mix.—p. 99.
*Dehydrated pineapple.—p. 99.
*WPB orders.—p. 113.
*Capital views.—p. 114.
Food equipment news.—p. 125.

Frozen Milk. It is now possible to manufacture a frozen, concentrated milk for consumers. The process, similar to that used for other types of frozen food, consists of pasteurizing high quality fresh fluid milk at high temperatures; condensing it, in the absence of copper; homogenizing it; freezing it in an ordinary ice cream freezer; and finally, after packaging, storing in a freezing room at not above 10°F. until placed in the hands of the consumer. The milk is reconstituted to the fluid state by undisturbed thawing in hot water. This milk might be used in areas lacking sufficient fresh fluid milk, in place of evaporated milk, or on ships. Flavor change is perhaps the chief objection to reconstituted frozen concentrated milk.

Soy Butter. Soy butter, a new product, is similar in taste and appearance to dairy butter, but will not turn rancid. Hardened soybean oil is churned in soy milk, other ingredients are added and the butter packaged in either pint-size ice cream-type cardboard containers or fiberboard tubs holding 38 lb. May be used in cooking, baking, and deep-fat frying.

Sweet Potato Products. The Alabama Agricultural Experiment Station is manufacturing, experimentally, on a semi-commercial scale, 12 different prepared, ready-to-eat foods from sweet potatoes, all packed under the brand name, Alayam. The products, high in carbohydrate and carotene and containing moderate amounts of vitamin C, iron, and protein, derive their sweetness and flavor primarily from the sweet potato itself. Eggs and flavorings provide variety. Items include Golden Nuggets, a breakfast food, Alayam Cookies, and Fluffies.

New Products. The addition of honey to ground mustard seed, vegetable oil, wine vinegar, cornstarch, salt, spice, herbs, and Burgundy wine produces a new honey mustard with a decided and pleasing smoothness. Minted apple chutney, containing apples, sugar, oranges, raisins, vinegar, spices, pecans, and mint, is a new specialty product, to be served as a relish with meats.

Dry Cheese Mix. A dry cheese mix which can be stored safely for 12 months without refrigeration, as perfected by the Doughboy Mills, is reconstituted with cold water and used as a soup, spread, or sauce, depending on the amount of water added. Spices and flavorings have been omitted to make it more adaptable to local tastes. Compressed bricks are packed in 1-lb. packages.

Dehydrated Pineapple. Dehydrated pineapple from Mexico, packed in 5-gal. tin cans hermetically sealed, or in 5-lb. compressed bricks, is being distributed in limited amounts to institutions and industrial plants by Little Co., Inc. One pound yields 8 lb. rehydrated product, and may be substituted for the canned or fresh fruit in syrups, pie, or cake fillings. Requires 24 hr. to reconstitute.

Glass Containers. Chicken and turkey à la king, chicken and turkey with egg noodles, boned turkey, meat loaf, clam broth, and soup mix, whether dehydrated or paste, have been added by WPB to the list of products that may be packed in glass containers with metal closures.

Excessive Wear. WPB has acknowledged the fact that inexperienced operators and long hours of use cause excessive wear on machinery, increasing the demand for repair parts.

Synthetic Weather. The Government is now developing testing methods in which exposure tests can be made by artificial weather conditions created in a laboratory to determine the effect of weather on food in containers.

Better Trained Workers. The training courses financed by the Government through the War Manpower Commission, Office of Education, and other government agencies, offset in many respects the difficulties many employers are experiencing with inexperienced and mediocre workers. Facilities of nearby technical colleges, universities, and institutes equipped for technician training are available.

The Army Dietitian in Ireland. You were interested in what I meant by semi-self-service, and also our methods of controlling food wastage on the wards. We use the same type of service here. The chow line is set up in cafeteria fashion for self-service on all items except those that are rather limited as to quantity such as meats, and canned fruits. This method allows the patients, and officers and detachment, too, to take only what they can eat. To avoid bread wastage we have had it cut in quarters and half-size slices. To avoid vegetable wastage, we have our cooks prepare the minimum amount of such vegetables as beets, spinach, and sauerkraut, and open extra cans during the meal hour, if necessary. In all messes we measure the edible food waste, which is chiefly vegetables. Bread wastage was our greatest problem on the wards in Ireland until we cut it in small sized slices before sending it out of the kitchen. Over here, because of our more active patients, we have little food wastage. Their appetites are much better and sometimes we wonder if we'll have enough to satisfy them on the daily rations now issued. Multi-vitamin tablets are issued with the rations here. They accumulated too quickly for special diet patients only, so we have been giving them to other patients in the ambulatory line who seem to need them. We have posted informational color posters from the National Live Stock and Meat Board on vitamins, and foods to include in the normal daily diet, to interest the patients in better food habits.

Lieutenant Rork and I wish you could see these overseas hospitals, and how well they function in spite of the handicaps.—*Maurine G. Champlin, 2nd Lt., M.D.D., A.U.S.*

News Notes

Chicago Meeting, American Dietetic Association. The twenty-seventh annual meeting of the Association was held in Chicago October 25–27, with the Chicago and Illinois Dietetic Associations acting as hostesses. Beulah Hunzicker and Mae Whitmer were convention chairmen. Total registration at the meeting was 2100, the largest in the history of the Association. There were 15 more exhibitors than last year, not including the Army Office of Procurement, Chicago Quartermaster Depot, and WFA, to whom complimentary exhibit space was allotted.

According to the report of the secretary, Mrs. Bessie Brooks West, as of October 15 there were 6792 members of the Association, 129 new members having been accepted in a two-week period September 30–October 15. This total represents a 6% increase over the preceding year. The office manager, Mrs. Ruth Bolt Benson, reported that 1404 changes of address had been received since September 1, and 5751 for the fiscal year 1943–44. The Placement Bureau has on file credentials and references for 4168 members.

Among the outstanding members attending the meeting were: Lulu Graves, honorary president of the Association, and Frances Stern, Boston Dispensary. There were many dietitians in uniform attending the convention, including members of the Canadian Army, Navy and Air forces. Representatives of each of the branches of the U. S. armed services and of one of the Canadian services took part in the program.

The Association was represented on a number of radio programs during the meeting, including the Breakfast Club Broadcast, and a television program. Nell Clausen, retiring president of the Association, Edith Barber, chairman of press relations, and Dr. Margaret Mead, Food Habits Committee, National Research Council, were among those taking part in the broadcasts.

Almost 600 attended the Welcoming Luncheon, at which Dr. Herman L. Kretschmer, president, American Medical Association, Malcolm T. MacEachern, associate director, American College of Surgeons, and George Bugbee, executive secretary, American Hospital Association, extended greetings. Sara Lockwood Williams recounted some of her experiences in "eating around the world."

Several trips were arranged for the delegates. Also, a Nutrition Clinic Demonstration was conducted at the Illinois Research and Educational Hospital, and a dramatic presentation, "If Five Dietitians Meet the Same Patient," at the People's Gas Company Auditorium. Dietitians visited school lunchrooms at the invitation of the Chicago Board of Education, and a large group made the trip to the Veterans Hospital at Hines, Illinois, where student dietitians, under the direction of Kathryn McHenry, acted as hostesses.

Reports of officers and section chairmen given at the annual business meeting will appear in the proceedings of the Association which will be distributed to members at a later date. The outline of the 1944–45 program of work presented by the incoming president, Maniza Moore, at the meeting of the House of Delegates will also appear in the proceedings. Officers elected for the year 1944–45 and new committee and section chairmen are listed on the officers page in this JOURNAL.

At the annual dinner, which concluded the meeting, the newly elected officers were introduced, and a plaque bearing the Association's seal was presented *in absentia* to Dr. Ruth Wheeler, a past president of the Association, who retires this year from the staff of Vassar College.

The 1945 meeting of the Association will be held at the Netherlands-Plaza Hotel, Cincinnati, October 15–19.

Dietetics as a Profession, completely revised and in an attractive new dress, with the Association's seal beautifully reproduced on the cover, came off the press during the annual meeting in Chicago. From the standpoint of content and artistic format, it is a publication of which the Association and each of its members can well be proud.

With a Foreword to the first edition by Mary I. Barber, and to the revised edition by Nell Clausen, the content covers such pertinent information as: Who is a dietitian? Where are dietitians employed? How do dietitians obtain positions? What are the conditions of work? What are the personal qualifications of a dietitian? The 35 pages are attractively illustrated with reproductions of photographs of dietitians in the armed forces; the dietitian at work on the ward, in the kitchen of large group food services, in hospital, college residence hall and state institution, at market, directing the food habits of the child in the school, managing the school cafeteria, supervising industrial feeding, and teaching the ambulatory patient in the food clinic. Lightened with attractive designs in color throughout, the booklet succeeds in being a reliable factual reference—one that will inspire those now active in the profession as well as those to whom it is chiefly addressed—our future dietitians. Copies are now available at 25 cents each on application to the American Dietetic Association, 620 N. Michigan Ave., Chicago 11.

Scholarship Fund, American Dietetic Association. The Executive Board of the Association on October 22 authorized that a gift from Professor E. V. McCollum to the JOURNAL be used as the basis of a scholarship fund to which the income from life membership dues, now held as a revolving fund, is to be applied. At a meeting of the Kansas Dietetic Association in April, following an address of the national president, Nell Clausen, a gift to the proposed scholarship fund had been made by C. R. Boyle of the H. D. Lee Company, Kansas City. In making the gift, Mr. Boyle expressed the hope that others will realize the importance of planning for the future which he and his company know is in store for dietitians.

Nutrition Foundation Scholarship Granted to M. Elizabeth Vaughn. Announcement has been made that a nutrition scholarship has been granted by the Nutrition Foundation, Inc. to M. Elizabeth Vaughn, Cook County Hospital, Chicago, effective November 13. Miss Vaughn received the B.S. degree from Keuka College in 1938, and completed the Boston Dispensary food clinic course in 1941. She has had hospital experience at Genessee Hospital, Rochester, N. Y., and Mt. Sinai Hospital, Philadelphia, and food clinic experience at Johns Hopkins Hospital and Cook County Hospital, where she has been for the past two and one half years.

Industrial Feeding. The printed report of WFA's nationwide survey of industrial feeding facilities, mentioned in this JOURNAL for October, p. 638, is now available from the Office of Distribution, WFA, Washington.

Storage Temperatures. Oranges, grapefruit, lemons and limes all need a moist atmosphere in storage to prevent drying out, but the temperatures required differ, according to plant scientists of USDA, as reported in the November 6 *Food and Home Notes*. For oranges, the best storage temperature is just above freezing—32 to 34°F. At this temperature they may be held in storage 8 or 10 weeks. Limes keep best at a slightly warmer temperature—45 to 48°F.—and may keep 6 to 8 weeks. Lemons need even warmer temperatures—55 to 58°F.—and may keep 1 to 4 months. The temperature for grapefruit depends on its source and condition. Sound fruit, not overmature, and not likely to suffer from stem rot, can be held at 45 to 55°F. for 6 weeks in storage. If there is danger of stem rot, 32 to 34°F. is best.

Investigations on the storage of California avocados show that the lowest temperature for safe storage is 40°F., and one variety, the Fuerte, needs at least 45°F. Some West Indian varieties need storage as warm as 53°F. Bananas need much the same temperatures. Held below 56°F., green bananas are injured by "chilling" which gives their skin poor color and prevents them from ripening properly when removed to a warm place.

Utility Beef. The October *Consumers' Guide* contains an article on the use of utility beef, including recipes for leftovers.

Victory Bulletin. Formerly issued by the Office of War Information, this weekly publication is now available from the American Council on Public Affairs, 2153 Florida Ave., N.W., Washington 8, at $5 per year. The publication is devoted exclusively to official information about war and postwar adjustment problems, regulations, procedures, and contains the text of the most significant government announcements, digests of all important regulations, and a guide to detailed information.

National Food Situation. A graph in the September *National Food Situation*, prepared by the Bureau of Agricultural Economics, charts the rise and fall of prices of food, non-food items, and cost of living in general for the period January 1939–August 1944. Retail prices of all foods combined rose sharply and steadily from the early part of 1941 until May 1943 when the index reached 143.0, then declined to 134.1 in March 1944 when they moved upward to 137 in August. During the period when food costs were declining, the cost of living remained relatively stable because of a compensating upward movement in non-food costs. The same issue lists retail prices as percentage of August 1939 prices as follows: fruits and vegetables 190, eggs 176, fats and oils 145, dairy products 144, meats 135, sugar and sweets 132, beverages 131, cereals and bakery products 116. Another table shows retail food prices and total cost of living figures for 1923–43, by years, and for 1944 by months through August.

Tomatoes, sweet corn, green peas, and snap beans represent

approximately 90% of the total tonnage of the 11 important commercial truck crops raised for processing in 1944. A considerable increase in the production of these crops has occurred to meet the increased needs of the war period, according to the "1945 outlook issue" of the *Vegetable Situation*, USDA. For the entire year 1944, the aggregate tonnage of commercial truck crops for fresh market is expected to be the largest on record, about one fifth larger than production in 1943. Although the prospective canned pack of vegetables and vegetable juices of the 1944–45 season is about as large as the pack of the 1943–44 season, civilians may receive 10 to 15% less because of increased military and other noncivilian requirements. Total supplies for civilian use, however, include a very large supply of home-canned food. Civilian per capita supplies of potatoes for the 1944–45 season will be the smallest on record if prospective government requirements are met in full. Civilian supplies of sweet potatoes probably will be slightly smaller than last season; of dry beans about one fifth less.

WFA has authorized packers of dried fruits, principally raisins and prunes, to release substantial quantities of the 1944 pack into civilian channels as rapidly as possible so that they may be available for the holiday trade. The current civilian allocation is equivalent to 4.9 lb. per capita compared with 5.5 lb. during the last 12 months and a prewar (1935–39) average of 5.6 lb. per capita.

Canners will be required to set aside from their 1944–45 packs quantities of single-strength citrus juices equivalent to the following percentages of the 1943–44 pack: grapefruit juice 39%, orange juice 30%, and blended grapefruit and orange juice 32%. Set-aside requirements for grapefruit segments will be the equivalent of 58% of the 1941–42 pack; only enough tin has been allocated to pack the set-aside stocks and therefore, for the third successive season, none will be available to U. S. civilians. It is expected that some 26,500,000 cases of citrus juices will be available for civilian consumption from the 1944–45 pack, slightly less than last year.

Copies of the tentative U. S. standards for 6 grades of Swiss cheese may be obtained from the Dairy and Poultry Branch, Office of Distribution, WFA, Washington 25.

To obtain the necessary quantities of canning beef essential to overseas military operations and other war uses, WFA has directed packers operating under federal inspection to set aside 80% of all canner and cutter beef for government procurement, and 60% of the choice, good, commercial and utility grade beef that meets Army specifications.

Retailers of meat are now allowed by OPA to sell pre-boned and pre-rolled roasts from short loins and standing ribs of utility and cutter and canner grades of beef.

Industrial Nutrition. The Office of Distribution, WFA, 150 Broadway, New York 7, announced that beginning in October it would issue, monthly, two services: the *Industrial Nutrition Service*, a leaflet containing information for editors of employee publications and individuals and groups promoting nutrition education in providing food and nutrition facts to the industrial worker and his family; and *Serving Many*, another leaflet containing food news for food managers of industrial plants, restaurants, hotels, and hospitals; as well as quantity recipes. Both are available free upon request.

Controlled Ration Test. A battalion of American soldiers on maneuvers at an altitude of 8850 ft. above sea level in Colorado were fed exclusively on American Army rations C, K, and 10 in 1, and Canadian Mess Tin B ration for a period of 60 days, according to the *Journal* of the American Medical Association for October 14. During this time they were engaged in vigorous combat training. At the conclusion of the test it was found that the troops were in better physical condition than at the start, with high morale. The rations were proved to be wholly adequate to sustain troops in vigorous combat. Four consultants in nutrition to the Surgeon General, Drs. Julian M. Ruffin, Fredrick J. Stare, R. H. Kampmeier, and Virgil P. Sydenstricker, assisted in the physical examinations. A unit from the Harvard Fatigue Laboratory under Dr. R. E. Johnson performed the laboratory examinations.

Lean Tom Turkeys. Studies on the fattening of turkeys made by poultry scientists of USDA showed that young turkeys do not put on much fat until they are at least 20 weeks old, according to the October 9 *Food and Home Notes*. After this age the young hens fatten more rapidly than the young toms. By the age of 32 weeks a hen may have fattened so much that 28% of her total weight is fat. Young toms, on the other hand, do not begin to fatten much until they are 24 to 28 weeks old. They may then put on up to 20% of their weight in fat. A tom turkey not much older than 5 months, therefore, is the best buy.

Rose Hips. The small red fruits of the wild rose, rich not only in color but also in vitamin C, may be made into jam, jelly, beverages, and desserts, the Idaho Agricultural Experiment Station reports. Tests showed that rose hips when ripe and fresh are so rich in vitamin C that 6 to 8 may be enough to supply an adult's daily needs for the vitamin. Directions for making the jam, provided by the Idaho Experiment Station and reported in USDA's *Food and Home Notes*, October 9, are as follows: Add 1 lb. fresh rose hips to 2 cups boiling water and simmer 30 min. Press through strainer to remove seeds and add just enough water to make 4 cups. Then use the liquid like raspberry juice to make either jam or jelly. For jelly, pectin must be added. Equal quantities of the strained pulp and water with sugar to taste make a pleasant fruit drink. The flavor of all these products is said to be much like raspberry.

Rationing and Price Control. Retail mark-ups of 10 cents a pound for fresh cranberries, effective October 26, were established by OPA, making the highest retail price about 41 cents per pound.

Spinach ceiling prices were increased in October about 2½ cents a pound at the retail level. A recent survey revealed that damage to the spinach crop in the Middle Atlantic states by the hurricane had increased the loss, in addition to that caused by the drought, to about 40% of the average crop for 1932–42.

Fishermen's prices on round albacore (tuna fish) will be reflected at retail by an increase of about 1 cent a pound for the round fish, 2 to 3 cents a pound for cuts and fillets.

U. S. civilians have been allocated more than 103,000,000 bu. of apples for consumption in fresh and processed form during the 12-mo. period ending next July. This is 83% of the estimated total supply, and 13 lb. per capita more than was available to civilians last year. More than 21,000,000 bu. remaining, or 17% of the supply, have been allocated to the U. S. military services and to our allies and U. S. territories—60% in processed form. All dried apples have been allocated to the armed forces and to our allies and territories.

National Restaurant Association Survey. A study of the data accumulated and charts compiled from replies received by the National Restaurant Association to questionnaires sent to all types of restaurants regarding the need for equipment, indicated very clearly that certain items were more acutely needed than others. That needed daily to serve patrons, including knives, forks, spoons, dishes, trays, and salt and pepper shakers came first on the list. Labor-saving equipment naturally follows, with particular demand for dishwashers, mixing machines, and potato peelers. Restaurants also report a great shortage of garbage cans. Many restaurants classify the refuse, which means that coffee grounds and other items must be put into separate containers. Certain other items of equipment were checked by every restaurant reporting, as being "needed now or before the end of the year." The complete tabulation is contained in a leaflet distributed by the association. Copies have been furnished to the Office of Civilian Requirements and it is expected that future production of equipment manufacturers will be aimed at the most important shortages.

National Association of Hotel and Restaurant Meat Purveyors. The second annual meeting of this association was held in Chicago October 9. Ellard Pfaelzer of Pfaelzer Bros., Chicago, was reelected president. Meat regulations and the various problems arising under these were considered in a panel discussion in which several OPA officials participated.

Employment of Servicemen's Wives in Hawaii. The following statement appeared in the *Honolulu Advertiser*, September 10, 1944: "The United States Employment Service of the War Manpower Commission receives a large number of inquiries from servicemen seeking to obtain jobs for their wives, under the impression that if the wife has a job waiting for her, the granting of travel permits will follow automatically. In order to clarify the matter, the following statement has been issued: 'The War Manpower Commission has been advised by the Office of Internal Security that under the rules and regulations presently governing transportation of civilians from the mainland to Hawaii, wives and/or dependents of members of the Armed Forces are strictly prohibited from entering the Hawaiian Area unless they are former bona fide residents of the Territory. The term, bona fide residency, refers to all persons who were regularly and permanently domiciled in the Territory prior to December 7, 1941. It was further emphasized that bona fide residency is the only condition under which service dependents can qualify for entry into the Hawaiian Area; however, assurance of employment in war work or essential private industry will expedite transportation for those who are eligible for passage.' "

Inter-American Institute of Agricultural Sciences. With formal arrangements completed for permanent organization of this institute, the treaty giving birth to the new instrument of cooperation entered into force November 30, according to the Office of the Coordinator of Inter-American Affairs. Nicaragua became the fifth American republic to deposit her ratification with the Pan American Union, thus fulfilling a provision making the treaty operative 3 months after at least 5 ratifications have been deposited. First country to deposit her ratification was El Salvador, followed by the United States, Guatemala, Costa Rica, and Nicaragua. Eight other American republics have signed the agreement, but their governments have not completed steps for ratification. In the meantime, the institute, which has been established at Turrialba, Costa Rica, already has started function-

ing with initial funds of $500,000 provided by the United States through the Office of Inter-American Affairs.

The institute is designed to function as an aid to research and experimental stations for agricultural science in the American republics. The director is Dr. Earl N. Bressman, formerly engaged in agricultural research for the U. S. Government. The institute is expected to play an important role in the study of plant diseases and development of new plant varieties. The plan is to organize courses of study, with a student body representative of all the Americas. Outstanding agricultural scientists of the hemisphere are to be selected to guide the students in their research.

Food Production in Haiti. United States food technicians will assist the Haitian government in an intensive program to increase food production in Haiti during the next year, according to terms of a cooperative agreement announced in Washington by the Institute of Inter-American Affairs. Under the agreement with the institute, which is an agency of the Office of Inter-American Affairs, the Government of Haiti will assign $50,000 for program operations and the institute $125,000, of which $50,000 will be made available immediately and the remainder when needed. In addition, the institute will provide a small field party of agricultural specialists acceptable to the Minister of Agriculture to assist in the consummation of the cooperative food production program. The joint program will be in effect until September 30, 1945, after which properties accrued under the program will revert to the Haitian government as in the case with food agreements signed by the institute with other American republics.

Nutrition Survey, Naval Training Station, Norfolk. A third nutrition survey made by the Naval Medical Research Institute, Bethesda, Maryland, of different naval stations has been published as Report No. 4, Research Project X-184. To evaluate the adequacy of the diet served in two galleys at the Naval Training Station, Norfolk, Va., samples of meals were taken for a period of 2 weeks, May 2–16, 1944. One mess hall fed an average of 3688 men, the other, 3302 men and women in separate mess halls attached to the same galley. The amount and composition of food served each man per day averaged 3358 calories, made up of carbohydrate 42%, protein 14%, and fat 44%. It was reported that about one seventh of the day's nutrients served found their way into the garbage cans of the scullery. The amount of solids per man per day in these wastes was 104 gm. The refuse contained: protein 10, fat 30, ash 6, carbohydrate 58 gm. The calories amounted to 538. The water-soluble vitamins in the refuse amounted to thiamin 0.4 mg., riboflavin 0.8 mg., and niacin 9 mg. per man per day. The estimated purchase of foods at Ship's Service, about 60% of which was in the form of candy bars, accounted for 522 calories per man per day which compensated closely for the edible losses disposed of in the scullery. Estimates of the nutritive value of the food issued were compared with the true values found by analysis. Estimates were too high in calories and too low in calcium, which are in accord with earlier findings. It was reported that a satisfactory working technique for measuring the vitamin C in mixed food samples taken in the galley at mealtime had been devised. Recovery tests based upon known additions of ascorbic acid were used to check the adequacy of the method. A comparative study of diets of men and women fed in separate mess halls served by the same galley showed that items refused by the women were quite different from those refused by the men. Bread, potatoes, breakfast beans, and even pie made less appeal to the women than to the men. It was stated that more studies of the food tastes of women need to be made if their nutritional requirements are to be satisfied in the mess hall.

As a preliminary to studies in losses of vitamins during cooking and preparation, the relative importance of different fresh vegetables and fruits in feeding both the fleet and land stations was determined. The following values in percentage by weight of issue indicate relative use: potatoes 47.3, cabbage 5.5, onions 4.9, lettuce 4.6, carrots 3.1, celery 3.0, tomatoes 2.8, sweet potatoes 1.6, oranges 8.5, apples 7.0, and grapefruit 2.3. It was pointed out that in some cases the amount of a given vegetable used is so slight that it makes an insignificant contribution to the vitamins in the diet even if all of the vitamin value is retained.

Dr. Gladys Branegan on the Staff of Hunter College. According to an announcement made by President George N. Shuster, Dr. Branegan has been appointed visiting professor and chairman of the newly created Department of Home Economics at Hunter College, New York. Dr. Branegan is on leave from her position as dean of home economics, Montana State College. A former president of the A. H. E. A., she is also a member and an active worker in many other professional groups including the American Association of University Women, National Education Association, A. D. A., National Conference on Family Relationships, American Academy of Political and Social Science, and American Association for the Advancement of Science.

Hunter College has offered a major in home economics since 1939 but now that an independent department has been established it will undoubtedly greatly expand its work in this field, Dr. Shuster states. In addition to Dr. Branegan the day school staff includes Drs. Marguerite Gauger and Gertrude N. Borgeson, Anna Viola, Dorothy Stepat, and Mrs. Reba Kreidler. At the evening school, in addition to regular staff members, classes are taught by Mary Walton, Mrs. Mary Bloetjes, dietitian at the Hospital for Joint Diseases, Mildred Greenberg, and Mrs. Mary Wilson. Courses being taught at the present time include foods and nutrition, textiles and clothing, home planning and furnishing, family relationships, home management, quantity cookery, institutional management and purchasing.

The release states that "The war has heightened the demand for dietitians, managers of school lunchrooms, industrial in-plant feeding, restaurant and hotel food services" and that there is also a shortage of home economics teachers to meet all of the requirements of the city schools and the state education department for teachers of homemaking.

Greater New York Dietetic Association. At the October 11 meeting Hester Hensell, director of public relations, Polish Information Center, New York City, discussed "Postwar Europe." "The Future of Nutrition in the Postwar Period" was presented at the November 8 meeting, and the December 13 program will include "The Present Concepts of Dietary Management of Diabetes Mellitus," by Dr. Franz Jost, director of the diabetic clinic, St. Vincent's Hospital; and "Dietetics on the War Front," by a dietitian recently returned.

The annual Mary Swartz Rose Memorial Lecture will be presented at the Academy of Medicine February 14.

Louisiana Dietetic Association. Officers for the current year are: president, Bernes Larson, Hotel Dieu; vice-president, Jeanne Le Tourneau, and secretary-treasurer, Mabel Bersuder, both of Charity Hospital, New Orleans. Committee chairmen are: Community Education, Mrs. Jane Strickland Foster, Baptist Hospital, New Orleans; Diet Therapy, Madge L. Meyers, and Professional Education, Sister Euphemia, both of Charity Hospital; Administration, Mrs. Elva Kahrs, Touro Infirmary, New Orleans. It was decided at the spring meeting that the association would have only two meetings annually. At the fall meeting, New Orleans, November 16, general and committee sessions were conducted at Charity Hospital and at the dinner meeting Major W. Goldfuss, M.C., A.U.S., food supervisor for the New Orleans Port of Embarkation, was guest speaker.

A new local group, the New Orleans Dietetic Association, has been organized and the following officers elected: president, Mrs. Kahrs; vice-president, Adele Corey, Touro. A secretary-treasurer will be appointed later. Committee chairmanships will be filled by those holding the respective offices in the state association. Dr. R. L. Pullen, clinical director, Charity Hospital, was speaker at the October meeting.

Recent appointments include the following: Josephine Faunce and Florence Caswell, Marine Hospital, New Orleans, now at Marine Hospital, Galveston, and Marine Hospital, San Francisco, respectively; Emily Lou Peeler, Florida State College for Women, Miss Corey, Jackson State Hospital, and Kathryn Bryan, Christ Hospital, Cincinnati, now at Touro Infirmary; Shirley Johnson, Northern Pacific Hospital, Missoula, Montana, now at Charity Hospital.

A training course for student dietitians was opened in July at Charity Hospital with the following enrollment: Rovana Duparc, Florida State College for Women; Carolyn De Bartolo, Iowa State College; Louise Cowan, Marian Bolin, and Eileen Desmond, Louisiana State University; Lucy Lee, Phina Curcio, Virginia Small, and Johnette Blackledge, Mississippi State College for Women; and Theda Dykes and Mrs. Lois Wheat Keck, University of Alabama.

Michigan Dietetic Association. Many members of the association attended an all-day regional conference on "Implications of Nutrition and Public Health in the Postwar Period," sponsored by the Children's Fund of Michigan, Detroit, November 3. The program was as follows: "Protein Deficiencies in Man," Dr. L. Emmett Holt, Jr.; "Maintaining Dental Health," Dr. Philip C. Jeans; "Vitamins and the Health of the Nation," Dr. Charles G. King; "Food Production for Better Health and Longer Life," Dr. L. A. Maynard; "Role of Food Technology in Improving Nutrition," Dr. Roy C. Newton; "Nutritional Reconditioning of Children in Occupied Countries," Dr. Harold C. Stuart; "Research and Nutrition for Human Health," Dr. Frederick F. Tisdall; "Our National Diet and Future Health," Dr. E. V. McCollum; "Relation of Diet to Immunity," Dr. Paul Cannon.

The annual fall meeting of the association was held in Detroit, November 4, with the following program: "Pointers on Wartime Purchasing," Frank J. Breusch; "The Nutritionist and the Community," Dorothy Hacker, Visiting Nurse Association, Detroit; "Practical Aspects in the Treatment of Diabetics," Dr. William Revena, Harper Hospital; "Psychological Aspects of Food," Dr. John W. Dorsey, Children's Center, Detroit. Presiding officers were Mary M. Harrington, president, Michigan Dietetic Associa-

tion; and Jane M. Porter, vice-president, Detroit Dietetic Association. Workshop discussions were conducted by members of the Administration, Diet Therapy, Professional Education and Community Nutrition Sections.

Marriage announcements include that of Helen Hawkins to Dr. R. E. Crissey; Mary Agnes Johnson to Mr. B. Oswell; and Margaret Steele to Mr. Robert Foerch.

Marjorie Stewart has been awarded a fellowship and Lucille Frech has accepted an appointment as research nutritionist, both at Cornell University.

Student dietitians at Henry Ford Hospital are: Mary E. Bristol, North Dakota State College; Lois Killberg, DePauw University; Ruth Clark, Kansas State College; Janet Nichols, Wittenberg College; Leila Paxman, Mills College; Mary A. Click, Purdue University; Rosemarch Gaines, College of St. Teresa; Biruta Welaish, State Teachers College; Virginia Lindsey, Florida State College for Women; and Virginia Scott, Michigan State College. New students at St. Mary's Hospital include: Jean Kennedy, Clarke College; Beatrice Rupp and Josephine Beuchey, Mt. St. Joseph's College; Isabel Robertson and Sister Mary Lenore, Iowa State College; Ann Sack, Mt. St. Scholastica College; Bernadette Randay, St. Joseph College; and Mary Filliger, Oregon State College. At Harper Hospital, Mary M. Budd and Virginia Smith, Iowa State College; Beverly Dew and Jacqueline Dew, Florida State College for Women; and Mary J. Rankin, Park College, are enrolled.

North Carolina Dietetic Association. The annual meeting was held at Woman's College, University of North Carolina, November 18, Blanche Tansil, president, presiding. The program included: "The Dietitian and the State Nutrition Program," Dr. Bertlyn Bosley, State Board of Health, and Mrs. Stella Cusick, State Nutrition Committee; association reports and announcements; forum session on "Meeting Present Day Problems of the Dietitian," including "Securing Employees, Labor Specifications, Hours and Wages," William B. Logan, acting state supervisor of distributive education, Raleigh; "Work Schedules, Training and Morale, Turnover," Mabel Swanson, Woman's College; "Establishing Basic Standards in Food Handling, Preparation, and Recipes," Marjorie Farrar, Charlotte Memorial Hospital; "Meeting Standards of Sanitation and Equipment," M. M. Melvin, Chief Sanitary Inspector, State Board of Health; "Control Through Simplified Operations and Records," Mrs. Frances R. Ferrell, Director of School Cafeterias, Durham; "Control Through Food Costs and Wartime Measures," Boyd Morris, president, North Carolina Restaurant Association.

Pittsburgh Dietetic Association. Following are the officers elected for 1944–45: president, Constance Weiss, Shadyside Hospital; vice-president, Alice E. Mack, Allegheny General Hospital; secretary, Peg Watson, Dairy Council; treasurer, Mary Wand, Elizabeth Steele Magee Hospital.

Word has been received from Lt. Eleanor Johnson that she is on duty in New Guinea.

The following appointments have been announced: Frances Matuschok to Magee Hospital; Doris Hieler, Children's Hospital; Constance Roddy, Presbyterian Hospital; and Marian Sizelone, Allegheny General Hospital.

Announcement has been received of the marriage of Kay Patroski, Pittsburgh City Home and Hospital, to Private Raymond Flucker, A.U.S.

Mrs. Maxine Shoemacher McCullough has resigned her position at St. Margaret's Hospital.

St. Louis Dietetic Association. Fifteen new members and 16 student dietitians were introduced at the October meeting at which the various opportunities in the field of home economics were discussed as follows: "The Work of the Home Economist and Nutrition Consultant at a Family Welfare Agency," Mrs. Mildred Frier; "Radio as a Guide in Disseminating Nutrition Information," Mrs. Foster Lewis; "Nutrition in Industry," Mrs. Ruth Sheer Reznikoff; "The Dietitian in Research," Prudence Dorn.

The association sponsored a bread-making demonstration given by the Wheat Flour Institute during the month of October.

The 1944–1945 officers are: president, Helen McLachlan; vice-president, Mrs. Helen Struble; secretary, Helene Knapp; and treasurer, Lorraine Knese.

News From Advertisers and Exhibitors. Alice M. Cooley, director of home economics, *National Dairy Council*, 111 North Canal Street, Chicago 6, has for distribution reprints of "Ice Cream—A Basic Food" offering considerable information concerning wartime restrictions on the manufacture of ice cream as well as information concerning its value in the school lunch.

In a recent release, R. F. Bisbee, manager, quality control, *Westinghouse Electric and Manufacturing Company*, Mansfield, Ohio, reviews this firm's methods of maintaining porcelain enameling quality control. Samples of production pieces are subjected to such tests as: dropping a steel weight weighing 135 gm. on the face of the firmly supported test piece, and increasing the height one inch for each succeeding drop until the ground coat is exposed; bending in cross bend machine until fracture occurs across the entire width of the piece; heating to 550°F. then placing immediately in ice water. All results are recorded and compared to establish standards. In a study conducted by the company, it was found that a large percentage of the workers employed as color matchers were deficient in vitamin A. A balanced diet was administered to some and vitamin A therapy to those who "do not like foods containing sufficient vitamin A." After recovery, it is reported, rejects on the assembly line were reduced from an average of 1.7% to .3 of 1% over a 4-year period.

Hoffman-La Roche, Inc., Nutley, N. J., announces a new wafer for oral calcium therapy, Larocal wafers with vitamins C and D. It is claimed that this is not "just another" oral calcium preparation. Larocal wafers contain a generous amount of calcium in the form of calcium arabonate—readily soluble, non-irritating, well tolerated, and promptly absorbed salt which is free from chalky taste, and vitamins C and D in generous quantities—the latter for an important role in the absorption and utilization of calcium and the former for its part in the formation of dentine and bone matrix. These three ingredients are incorporated into candylike wafers with a taste so agreeable that, it is believed, patients young or old need not be coaxed to take them. Like all Roche products, they will be marketed only through professional channels and will never be advertised to the laity.

A lecture and demonstration on cutting, cooking, and carving meat, by Jessie Alice Cline and Max O. Cullen, *National Live Stock and Meat Board*, was one of the outstanding features at the third Wartime Conference of the National Restaurant Association in Chicago in October. Miss Cline emphasized the importance of temperature control, stating that meat should always be cooked at low temperatures and only to the preferred degree of doneness, in order to decrease shrinkage and produce more tender, juicier, and better flavored meat, more uniformly cooked. Less fuel is required, although the cooking time is longer, and less work is involved—less watching of the meat during cooking and less work in cleaning equipment afterwards because there is less burning of the fat on pans, racks, and ovens, and carving is easier and more economical. Miss Cline also demonstrated the best methods of preparing the lean, nonrationed utility grades of beef now on the market. She stressed the importance of cooking this beef slowly, longer, and, if possible, by moist heat methods such as braising and stewing. Mr. Cullen demonstrated innovations in cutting beef, lamb, and pork, and showed how to get the most value for ration points. A large chart was used to show the percentage yield of each cut of meat in proportion to the whole carcass. These demonstrations were followed by the premier showing of the film, "The Way to a Man's Heart," which may be obtained for group showing by writing the National Live Stock and Meat Board, 407 S. Dearborn St., Chicago.

The *Cereal Institute, Inc.*, 135 S. La Salle St., Chicago 3, has released a set of educational material for use in junior and senior high school home economics classes as well as in adult education programs. The complete kit consists of a teacher's source book, a special teaching outline, a wall chart, and a student's notebook folder, all of which have been carefully prepared and attractively presented. Menus and preparation schedules for breakfasts prepared in 10, 15, and 20 minutes are included in the student's notebook sheet, and several others, complete with recipes, are given in the teacher's manual. Suggestions for entertaining at breakfast are a unique feature. As a companion piece to the above-mentioned kit, a "Cereal Source Book," prepared by Elmo Roper, has been published. Copies of the material are available without charge from the institute, according to Agnes Reasor, home economics director.

The sixth edition of "Vitamin Summary and Cereal Food Facts" has been published by the Nutrition Department, *Quaker Oats Company*, 141 W. Jackson Blvd., Chicago 4. Copies of this very useful compilation are available to dietitians and nutritionists upon request, but because of the wartime shortage of paper it is requested that only the minimum number of copies needed be ordered and that the leaflets be shared so far as possible.

"Mobile Canteens" is the title of a useful and attractive catalogue which describes and illustrates 8 basic models in mobile canteens for in-plant feeding, designed and built by *S. Blickman, Inc.* An entire page is devoted to each model, with a large photograph showing plainly its important features, and a full description and specifications. The models included are of various capacities equipped to serve up to 450 persons and designed to be equally serviceable in every type of industry, regardless of size or arrangement of plant. The more elaborate canteens are practically complete restaurants on wheels; others are intended to be used in connection with employee's cafeterias or lunchrooms. Six of the models are electrically heated. Canteens can also be built with variations to meet individual requirements.

The appointment of Scott C. Rexinger as sales manager of the Commercial Appliance Department, replacing Burton M. Riker, now assistant to the executive vice-president, *Toastmaster Products Division, McGraw Electric Company*, has been announced. Mr. Rexinger was formerly with Apex Electrical Manufacturing Company and the Westinghouse Electric Supply Company.

INDEX TO VOLUME 20

The following abbreviations indicate the source of the material indexed: "ab" abstract under current literature; "cc" current comment; "ed" editorial; "f" filler; "n" nutrition and the war; "nn" new notes. A star (*) indicates an original article in this JOURNAL. Books reviewed appear in the subject index under "book reviews." Author index, which follows subject index, includes only the names of authors of original material appearing in this JOURNAL in full or abstracted in the editorial section or in fillers, and authors of books reviewed.

Subject Index

A

Absenteeism, ab 270, 338
Accident (*see also* safety), prevention, ab 408, 776
Accounting (*see also* food cost accounting), institution, *228
  rationing, and food control, *593
Achromotrichia, ab 46, 476
Acid (*see also* amino, ascorbic), fatty (*see* thiamin)
Adaptation, dark (*see* vitamin A)
Addison's disease and hyperthyroidism, ab 40
Adrenal, alterations, and filtrate-factor, ab 328
  tumor, ab 552
Alfalfa, in human nutrition, ab 634
Allergy, history taking, ab 328
  milk sensitivity in, ab 773
  oral de-allergization, ab 478
  synthetic diet in, ab 478
  treatment, in children, ab 42
Alpha-tocopherol (*see also* vitamin E), in abdominal fats, ab 482
Aluminum cleanser, ab 338
American Dietetic Association (*see also* association, state), annual meeting 1944, nn 564, f 578, ed *766, nn 777
  Executive Board, nn 186
  House of Delegates, ed 447
  Nominating Committee report, 1943–44, ed 447
  office staff, changes in, ed *231
  President, address, *1, *663
  President, 1944–45, Maniza Moore, ed *691
  requirements for active membership, 230
  requirements for entrance, approved training courses, 230
  scholarship fund, nn 777
  war and the, *1
American Home Economics Association, annual meeting, nn 340
American Medical Association, annual session, nn 564
American Red Cross (*see* dietitian, nurse, nutrition, Red Cross, volunteer)
Americanism *vs.* collectivism, f 751
Amino acid (*see also* specific amino acid, protein), effect on liver fat, ab 630, 774
  essential, ab 50, *70, ab 482, 630
  metabolism, ab 480
  microbiologic measurement, ab 332
  nutritional opportunities with, *69
  studies, ab 112
  synthesis, ab 178
  and vitamin B_4, ab 48
Anaphylaxis (*see* allergy)
Anemia (*see also* blood, iron), iron and copper deficiency in, ab 772
  in nicotinic acid deficiency, ab 178
  pernicious, ab 332, 406
  and pyridoxine deficiency, ab 480
Annual meeting (*see* A. D. A.)
Antitoxin, in plant material, ab 404
Apple, powder, ab 408
  ripening, ab 116
Apricot kernels, ab 114
Argentine, diet—1750, ab 634
  Dietetic Association, f 314
  Nutrition Institute, f 675
Ariboflavinosis (*see* riboflavin)
Army (*see also* diet, dietitian)
  baking, cooking, ab 180, 184
  dietitian, ed *19, n *22, n *34, nn 186, f 252, 394, 398, nn 488, f *760
  dietitian, appointments and promotions, Medical Department, 36, 102, 170, 250, 324, 394, 468, 546, 624, 700, 770
  dietitian, duties, nn 710
  dietitian, in an evacuation hospital, n *250
  dietitian, overseas, f *3, ed *376, f *443, f *445, ed *692, n *767
  dietitian, training course, Fitzsimons, n *769
  feeding program, *140, *144, n *165, n *166, n *168
  food conservation, f 372
  food service in theaters of operation during present war, *444
  food waste in, *357
  health of, ab 46
  hospital diet, *430
  hospital food, 1918, f 360
  Medical Department and the dietitian, *441, nn 710
  rations, f *722, nn 778
Arthritis, therapy, ab 476
Ascorbic acid (*see also* vitamin C and specific food), ab 178
  and bleeding gums, ab 704
  content, canned fruit juices after opening, effect refrigeration, *223
  content, chard and greens, ab 704
  content, marmalade, *668
  diuretic effect, ab 332
  in grapefruit, ab 334
  loss in minced salads, ab 630
  retention, quick-frozen broccoli, *369
  retention, spinach, *757
  retention, vegetables, canned, *752
  retention, vegetables, fresh, *757
  rose hips for, an 778
  and thiamin, interrelationship, ab 46
Asparagus, canned, vitamin retention in preparation, *752
Association, state, numerical representation, cc *163
Avitaminosis (*see also* vitamin), intestinal disorders in, ab 476
Avocado, vitamin B complex in, *688
  vitamin K in, *761

B

B-alanine, biosynthesis, ab 558
Bakery techniques, ab 180, 484, 775
Bananas, ab 484, nn 492
Beans, ascorbic acid in, ab 330
  baked, nn 414, *752
  green, canned, vitamin retention in preparation, *752
  navy, digestion, ab 50
  as source of protein, *81
  soy (*see* soy, soybeans)
Beef (*see also* meat, protein, vitamin A), lower grades, utilizing, nn 712
  storage, changes in, ab 554
  tendering, ab 44
Beets, ascorbic acid in, ab 775
Belgium, food patterns, *679
Benson, Ruth Bolt, ed *231
Benzedrine, as cerebral stimulant, ab 44
Beriberi (*see also* deficiency, thiamin), congenital, ab 774
Beverage, cereal, ab 54, 176
Biotin, deficiency, ab 44
Birth rate, ab 406
Blanching, effects of, ab 336
Blood, donors, diet for, f 157, *747
  hemoglobin concentration and erythrocyte counts, *521
  lipids, and fasting, ab 334
  pressure, effect of vitamins, ab 108
  regeneration, riboflavin in, ab 48
  regeneration, in women blood donors, *747
  sugar, and fasting (*see also* diabetes), ab 552
Book Reviews, 38, 104, 172, 396, 472, 550, 626, 771
  Allergic, Are You? 172
  Allergies, Patient's, Elimination Diets and, 474
  Babies, Our American, 326
  Budget Standards, 326
  Canning in Wartime, 106
  Chemistry, Fundamentals and Applications, 172
  Children and Food in Day Care Centers, 626
  Cook Book, Wartime, 106
  Cookery, Fowl and Game, 474
  Cookery, Sea Food, 474
  Cooking, Blue Book of: Eat to Live, 104
  Cook's Away, 398
  Dictionary, Medical, American, Illustrated, 472
  Dietetics, Applied, 326
  Digestive Glands, Secretory Mechanism, 626
  Digestive System, Diseases of the, 771
  Eating Around the World, 550
  Food, 396
  Food, Canned, Reference Manual, 106
  Food Consumption, Family, in the United States, 771
  Food Enough, 38
  Food for the Family, 771
  Food and Food Products, Chemistry and Technology, 550
  Food, Man's: Its Rhyme or Reason, 104
  Food Preparation Principles and Procedures. A Laboratory Manual for College Courses in Food Manipulation, 398
  Food Selection and Preparation, 172
  Food Service Equipment, Care of, 472
  Food Specialist, Your Career as a, 104
  Foods, Microbiology of, 626
  Health, Personal and Community, 106
  Hospital Year Book, 626
  Kitchen, Maryland, Fifty Years in a, 626
  Meat, Cooking in Quantity, 398
  Meat, Cooking Without, 106
  Meat Lecture Charts, 398
  Medicine, A Hundred Years of, 396
  Menu and Recipe Book, Practical Economy for Epicures, 172
  Nursing for Community Health, 550
  Nutrition, Art and Science of, 474
  Nutrition and Dietetics, Fundamentals, 326
  Nutrition, Rose's Foundations of, 472
  Physiology, Textbook of, 172
  Plants, Wild, Edible, of Eastern North America, 38
  Shape, Get in, 550
  Solutions, Standardization of Volumetric, 550
  Soups, 100 Summer and Winter, 38
  Soybeans, From Soup to Nuts, 326
  Weight, Your . . . Signpost to Health and Longer Life, 771
Borden award, nn 196, 572, 716
Brazil, food problems, f 297
Bread, enriched, ab 482, 775
  making, ab 52, 408, 775
  as source of B vitamins, ab 330, nn 644
  standards, nn 418
British, Dietetic Association, nn 412, 638
  food problems, ab 184
Broccoli, quick-frozen, ascorbic acid, thiamin, and riboflavin retention in, *369
Bulgaria, food patterns, *682
Burns, treatment, chemical aspects, ab 556

Butter, fat, growth-promoting value, ab 636
  flavoring, ab 116
  vs. margarine (*see* margarine)
  outlook, ab 268, nn 712
  substitute, ab 114, 776
Buying (*see* equipment, food cost accounting, specific food)
B vitamins (*see also* vitamin B complex, work), deficiency, ab 560, 774
  and folic acid, ab 558

C

Cafeteria (*see also* food, industrial feeding, restaurant), industrial, ab 52, 116, 180, 562, 775
  job instruction training, ab 182
Caffeine (*see* gastric)
Cake, ab 112, 482, nn 494
Calcium, in carcinogenesis, ab 408
  intake, *671
  serum, maintenance, ab 702
Calories, intake, college women, *524, *671
  intake, high school students, ab 178
  national food consumption in terms of, f 85
  "normal," ab 634
Canada, nutrition in, ab 42, 256, 554, nn 572, ab 704
Cancer, etiology, ab 110, 408
  gastro-intestinal, ab 256
  research, f 326
Candy, nn 280, ab 484
Canners, under USDA continuous inspection, nn 278
Canning, ab 264, nn 414, ab 484, nn 570, ab 634
  arithmetic, nn 492
  effect of, on foods, f 219
  effect of freezing, ab 330
  methods and equipment, nn 60, cc 246, nn 276
  powders, ab 554
Capillary fragility, vitamin therapy in, ab 254
Carbohydrate (*see also* fat), metabolism, ab 774, 775
  in treatment of disease, *365
Carcinogenesis, role of calcium in, ab 408
Caries (*see also* teeth), *147, ab 476, nn 494
  and amylase, ab 480
  fluorine and, ab 478, nn 572
Carotene (*see* vitamin A)
Carotenemia (*see also* hypervitaminosis A), ab 254, 772
Carrots, canned, vitamin retention in preparation, *752
  dehydrated, ab 264
Catholic Hospital Association, ab 340
Celiac disease, proteolysed beef in, ab 773
Cereal, ab 182, 184
  prepared, vitamin content, nn 118, ab 706
Ceylon, malnutrition in, ab 42
Cheese, Cheddar, in cooking, ab 704
  dehydrated, ab 54, 776
  tidbits, ab 264
Cheilosis (*see* riboflavin deficiency)
Chemical needs, feeding children to meet, *602
Cherries, ab 408
Chicago (*see* A. D. A., annual meeting)
Chicory, ab 54
Children (*see also* infant, specific condition or disease), day care, ab 174
  diets, need for betterment of, *147
  eating habits, ab 632
  financial aid, in rearing, ab 556
  and fried foods, ab 334
  growth and development, ab 772
  labor standards, nn 418
  nutrition, Mexico, Egypt, Belgium, India, n 616
  nutrition, some problems of, in other American republics, *308
  obesity in, *361
  school, feeding to meet chemical needs, *602
  school, nutrition, ab 48, 554, 560, 702
  school, nutrition and scholastic attainment, ab 702
  thyroid disease, ab 628
Chile, dietetics and nutrition in, *312, cc *322
China, internment camp food, *213
  nutrition and dietary requirements, ab 256
  soldiers and college students, diet, ab 50
  starvation in, ab 554
Chocolate, bar, for Army, ab 54
  and cocoa, ab 50
  flavor, ab 266
  milk, growth of rats on, ab 560
Cholesterol, blood, effect of diet on, ab 108
Choline (*see also* erythrocyte), and hemorrhagic kidneys, ab 558
  and muscle creatine, ab 632
  phosphatide, turnover, ab 558
Cirrhosis (*see* liver)
Citrus, juice, canned, vitamin C, *223, ab 330
  products, ascorbic acid content, *668
  solids, ab 266
Civil service, positions for dietitians, nn 188, 566, ed *691
Cleaning, ab 114, 262, 776
Cocarboxylase (*see* carbohydrate, thiamin)
Cod liver oil, ab 334
Coffee creamer, automatic, ab 338
Colds, common, patulin for, ab 176
  diet and resistance to, nn 716
  vaccines, ab 258
Colitis, ab 328
College, courses, content and objectives of: institution management, ed *315
  dining hall, percentage distribution of expenditures, ed *540
  men and women, blood hemoglobin concentration and erythrocyte counts, *521
  nutrition program, role of dietitian, *590
  women, food intake, *524, *671
Colostrum, human, mineral and vitamin content, ab 634
Conservation (*see also* food), and use of our home food supplies, *9
Containers (*see* packaging)
Convalescent care, nutritional aspects, ab 628
Cookbook, Navy, f *720
Corn, canned, vitamin retention in preparation, *752
  frozen, thiamin content, ab 44
  germ, protein from, ab 50, 334
  oil, growth-promoting value, ab 636
Cost (*see* accounting, equipment, food)
Cottonseed meal, source of protein, *81
Council on Foods and Nutrition, ab 46, 556
Cow, mechanical, ab 630
Cozymase synthesis, ab 48
Cranberries, ab 408
Cream, for the sick, ab 258
Creatine (*see* choline)
Current Comment, 95, 160, 236, 316, 378, 540, 610
Current Literature, 40, 108, 174, 254, 328, 400, 476, 552, 628, 702, 772
Cushing's syndrome, skeletal demineralization, ab 42
Cystine metabolism, ab 406
Czechoslovakia, food patterns, *686

D

Dairy products, availability, *12
Deficiency (*see also* anemia, dietary, malnutrition, nutrition, specific mineral or vitamin), dietary, myocarditis and, ab 552
  diseases (*see also* specific condition), ab 480, 482
  syndromes, ab 482, 772
Dehydrated, foods, ab 52, 336, nn 642
  foods, vitamin content, *218
Dehydration (*see also* specific food or vitamin), ab 40, 54, 114, 264, 336, 704
Delinquency, juvenile, ab 176
Denmark, food patterns, *577
Dental records, *147
Deodorant, ab 410
Dermatoses, fat factor, ab 482
Detergents (*see also* cleaning), ab 116
Diabetes (*see also* insulin), ab 178, 628
  blood sugar, stability, ab 632
  capillary fragility, ab 254
  free diet in, ab 260
  glucose tolerance in, ab 628
  insipidus, ab 40, 702
  in selectees, incidence, ab 402
  therapy, ab 478, 556
  treatment, carbohydrate in, *365
  treatment, high-fat diets in, cc *612
Diarrhea, ab 328, 404
Diet (*see also* caries, children, specific disease, feeding, food, infant, nutrition, pregnancy, rationing), African, effect on rats, ab 330
  Benjamin Franklin on, f 338
  convalescent, ab 404, 628
  and eyeglasses, ab 180
  hospital, Army, *430
  hospital, some modern concepts concerning, cc *610
  institution, ab 636
  kitchen experience, bottleneck, cc *316
  and penicillin therapy, f 80
  synthetic, in therapy, ab 478
  for ulcer patients, ab 554
Dietary (*see also* deficiency, diet, nutrition), allowances, recommended, ab 260
  deficiency, and poliomyelitis, ab 402
  department, large, planning and equipping, *86
  essentials, ab 112
  nutritional quality, by chemical analysis, *742
  study, ab 402
  study, by chemical analysis, ab 704, *742
Dietetics (*see also* diet, dietitian, disease, food, nutrition), in accelerated nursing curriculum, n *458
  as a profession, nn 777
Dietitian (*see also* A. D. A., Army, industry, Navy, Women's Army Corps), Aide, junior, nn 494
  Aide, program, nn 340, 412, n *466, f 576, nn 638
  Aide, viewpoint, f *470, f *486
  in the armed services, ed *19, *691, *692
  Australia establishes training courses for, nn 272
  educational and training standards, historical notes on, ed *538
  in federal service (*see* civil)
  future of the, *587
  graduation, f *722
  hospital, f 92, 311, nn 564
  in hospital, educational role, ab 54
  in hospital, state, f 498
  in industry and other fields, training courses for, ed *538, cc *540
  in Peru, f 746
  place of, f 88
  refresher course, nn 278
  requirements for membership, A. D. A., 230
  role of, in a college nutrition program, *590
  in Royal Canadian Air Force, n *19
  serves, in a global war, ed *692
  students, needed, f 601
  students, study of needs and responsibilities, *533
  training courses, f *172, *230, cc *540
Dining, cars, in wartime, ab 268
  room service, ab 116
  with Samuel Pepys in seventeenth century England, *434
Disease (*see also* specific condition or disease), carbohydrate in treatment, *365
  resistance, and diet, ab 178
Dish storage, ab 484
Dishwasher, portable, ab 484
Dishwashing (*see also* cleaning, detergents) unit, planning, *86

Donors (*see* blood)
Dormitory (*see* college, food service)

E

Eastman Kodak Company, student training course, cc *540
Edema, famine, ab 554
Editorial, 18, 93, 158, 231, 315, 376, 446, 538, 609, 691, 766
Education (*see also* dietitian, health, nurse, nutrition), adult, ab 254
  requirements, membership, A. D. A., 230
Eggs, case, collapsible, ab 114
  chart, nn 346
  dry, ab 114, 336
  frozen, ab 116
  poultry, meat, and turkey, nn 194
  specifications, nn 712
  vitamin A in, ab 48
Electricity, saving, ab 336
Electronics, ab 114, 182, 408
Employee (*see also* labor, personnel), counseling, ab 410, 775
  female, ab 332, 408
  training, ab 54, 268, 334, 336, 776
  work manual, ab 628
Energy requirement (*see* calories)
England, nutrition under rationing, *4
  seventeenth century, dining, *434
Enrichment (*see also* specific food), ab 336
Environment (*see* work)
Equipment (*see also* kitchen), ab 52, 56, 116, 142, 264, 268, 410, nn 412, 492, 568, f 597, *600
  household, nn 644
  kitchen, ab 410
  and layout problems in wartime, *598
  and supplies, ab 338, nn 778
  wartime, constructing, *596
Ergosterol (*see* vitamin D)
Eritrea, eating in, f *445
Erythrocyte, ab 48, 702, 772
  count, of blood, college men and women, *521
Eskimos and Lapps, food for, ab 42
Europe, feeding, ab 174, *763
  food patterns, *676
  indirect war losses, f 474
Executive Board (*see* A. D. A.)
Exhibitors, annual meeting, f 648
Expert, limitations of, f 700
Eyestrain (*see* vitamin)

F

Fads, therapeutic, ab 174
Fasting and blood lipids, ab 334
Fat (*see also* butter, margarine, oil, shortening), carbohydrate-sparing effect, ab 328
  conservation and salvage, nn 278, 644
  in human nutrition, *83
  meat carcass, consumption and salvage, cc 614
  stored, mobilization, ab 260, 775
Federation of American Societies, ab 340
Feeding (*see also* diet, dietetics, nutrition), Army and Navy, *140
  mass, ab 182, 268
  plan, for adequate, in urban low-income groups, *605
  principles, f 576
Fellowship (*see* health education)
Fifth war loan drive, ed *376
Filtrate factor, ab 328
Fire extinguishing, ab 776
Fish, ab 338, 410, 484, 562
  dehydration, ab 264
Fisheries, Caribbean, development, f 304
Flatware, stainless steel, nn 346
Flour, enriched (*see also* enrichment), ab 52, nn 644
Fluorine, ab 328, 400, nn 714
Foley, Mary A., 1892–1944, ed *315
Folic acid, ab 112, 260, 558
Food (*see also* allergy, Army, dehydration, diet, specific food, nutrition, packaging, rationing, refrigeration, etc.), air transportation, f 527, nn 714
  analytical data, nn 710
  Army, f 360
  canned (*see* canning, vegetables)
  clinic, lives in peace and war, *427
  composition, work of committee on, *216
  conservation (*see also* food, waste), *9, ab 56, 262, f 372, ab 410
  consumption, national, in terms of calories, f 85
  containers (*see* packaging)
  control, and food rationing accounting, *593
  cost accounting, *140, *144, *228
  dehydrated (*see* dehydrated, dehydration)
  distribution, ab 264
  and Drug Administration, nn 194
  for Eskimos and Lapps, ab 42
  experts, civilian, nn 122
  facts and fads, ab 708
  fights for freedom campaign, nn 272, 638
  and Franklin, Benjamin, f 440
  frozen, ab 562
  habits (*see also* food patterns, and specific country or race), ab 406, *528, ab 632, 708
  habits, changing, from viewpoint of social anthropology, ed 158
  habits, of families in Lubbock, Texas, *528
  handlers, ab 484, 552, nn 638
  infants (*see* infant)
  intake, of college women: caloric intake and energy requirement, *524
  intake, of college women: protein, calcium, phosphorus and iron, *671
  managers, f 550
  "no point—low point," nn 344
  nutrients, foraging for, n *544
  and nutrition, international cooperation, present and future, *530
  and nutrition policy, here and abroad, ab 400, 775
  and nutrition problems, Puerto Rico, *305
  and nutrition, wartime and postwar trends, cc *160
  patterns, European countries, *676
  planning, postwar, f 592
  poisoning, ab 52, 336, nn 644
  practices (*see also* food habits), study of the dietary and, of 63 families in Lubbock, Texas, *528
  preparation, as it affects nutritional value (*see* specific food, or mineral, vegetable, or vitamin)
  preservation (*see also* specific process), f 222, ed 232, ab 486, nn 570
  production, the dietitian and, cc *242
  production, in South America, nn 194, 778
  production, in the state institution, cc *240
  raw, diet, ab 400
  refrigeration, f 219, *223
  relief and rehabilitation, f 184, *763
  Requirements Branch, Civilian, nn 192
  service (*see also* Army, cafeteria, industry, etc.) department, emergency devices in, *600
  service, directors, nn 194, 412
  service, institution, vitamin retention in vegetables, *369, *752, *757
  service, in theaters of operation, *444
  situation, national, f 14, 36, nn 58, 118, 188, ab 262, nn 274, 342, 416, f 424, nn 490, 568, 642, 712, 777
  strategy, allied, f 8
  supplies, conservation and use, *9
  technologists, national conference, nn 278
  in wartime, ab 184
  waste, f 11, *140, f 227, 601
  waste, method of checking and evaluating in hospitals and other feeding units, ed *376
  waste, war on, in the Army, *357
France (*see also* food patterns), nutrition situation, ab 406, 774
Franklin, Benjamin, and food, f 440
Freezing (*see* quick-freezing)
Fruit (*see also* specific fruit), canned, nutritive value, ab 628
  color retention, ab 54
  juices, effect of refrigeration, *223
  juices, storage, ab 44
  nutritive value, as affected by preparation, ab 44
  preserving, sugar in, f 597
  Velva, nn 644
Fuel, conserving, ab 56

G

Gastric, emptying time, at high environmental temperature, ab 476
  function, and emotions, ab 178
  secretion, effect of aluminum hydroxide gel, ab 476
  secretion, effect caffeine, ab 552, 702
Geriatrics, ab 556
Germ, wheat and corn, ab 558
Germany, food supplies, ab 406
Gillett, Lucy H., retires, ed 766
Glucose (*see also* diabetes), effect, on phosphate absorption, ab 775
  in thirst, ab 560
Glycogen formation, in liver, ab 48
Glycosuria, in meningitis, ab 702
Goiter, and thiocyanate, ab 174
Gout, ab 42, 634
Government orders (*see also* food situation, Office of Price Administration), ab 180, 262
Grades and standards (*see also* labeling), ab 262, 264
Greek food habits, ed 158, *681
Grow more in '44, ed *231
Growth, and extracts from testes, ab 478
  tissue, f 741
Guava, new uses, nn 492
  as source of vitamin C, ab 50

H

Hall, Gladys E., ed *231
Harvard, Army and Navy food service at, *144
  nutrition at, nn 710
Health (*see also* education, nutrition), during the war, ab 50
  education, fellowships, nn 412, 640
  education, in schools, ab 108, 774
  insurance, compulsory, ab 773
  public, ab 174, 332, nn 494, f 599
Heart (*see* deficiency, vitamin E)
Hematopoiesis, vitamin B_6 and, ab 334
Hemoglobin, concentration, and erythrocyte counts of blood of college men and women, *521
  levels, survey of, ab 773
Home economics (*see also* American Home Economics Association), nn 710
  history, ab 632, 634, 708
  in Liberal Arts colleges, ab 56
Home economist, what is a? f 143
Hospital (*see also* Army, cafeteria, diet, dietitian, employee, food), budget control, ab 773
  meals, ab 42, 44
  personnel management in, *137, ab 773
  waste control, ed *376, ab 773
House of Delegates (*see* A. D. A.)
Housekeeping then—and now? ed *446
Hungary, food patterns, *685
Hydrarthrosis, salt-free diet, ab 40
Hydrolysates (*see* protein)
Hypertension in military service, ab 48
Hyperthyroidism, and Addison's disease, ab 40
  and thiamin, ab 112
  treatment, carbohydrate in, *365
Hypervitaminosis A and carotenemia, ab 254
Hypoglycemia, ab 552
  treatment, carbohydrate, *365
Hypophysectomy, tissues after, ab 400

I

Ice cream, ab 182, 268, nn 712
Immunity, acquired, and protein metabolism, *77, ab 706
synthetic serum, ab 108
Indiana University meets needs of Army and Navy feeding programs, *140
Industrial, cafeteria, organization, f 599
cafeteria, personnel management in, n *164, n *390
feeding (*see also* dietitian, food, industry, lunch), nn 188, 192, ab 260, 262, 270, 334, 338, nn 344, f 550, nn 638
feeding, psychological aspects, n *622
nutrition committee, activities, n 620
nutrition program, WFA, n *382, nn 778
relations, research, ab 270
sanitation, ab 480
workers, nutrition of, ab 260, 478, 480
workers, women, diets of, f 56
Industry (*see also* industrial feeding), cafeteria kitchen, ab 562
dietitians in, training courses, ed *538, cc *540
group housing for women in, nn 418
menu and nutrition service for, f 665
nutrition in, n *384, ab 480, 706, nn 714
nutritionist in, n *386
training within, program, n *618
woman counselor in, ab 486
Infant (*see also* children), deaths, ab 256
feeding, ab 254, 256, 330
Institution (*see also* food cost accounting, food service, hospital, etc.), accounting, *228
diet, ab 636
Insulin (*see also* diabetes), ab 332
and alloxan, ab 636
globin, ab 772
of pancreas, adrenalectomy, gonadectomy, ab 552
requirement, after pancreatomy, ab 630
resistance, ab 42, 400
sensitivity, ab 552
Internment camp, food in occupied China, *213
food in the Philippines, f 270
life in, f 520
nutritional disorders in, ab 775
Iowa University, feeding Army and Navy at, n *166
Iron, absorption and elimination, ab 110
deficiency, nutritional, ab 42
ferritin, ab 48
intake, *671
Italy, food for, ab 50
food patterns, *680
hospital mess department in, n *767

J

Jaundice, nutritional deficiency and pneumonia, ab 50
JOURNAL, also serves, ed *18
back copies available, nn 186
combined issue, nn 488
to be microfilmed, nn 340
paper allotment, restrictions, ed *93
Juices (*see also* fruit), ab 114

K

Kansas State College, Army feeding program, n *168
Kansas University, feeding Army and Navy, n *165
Ketosis, fasting, and nitrogen excretion, ab 112
in normal and diabetic children, ab 328
Kidneys, hemorrhagic, and choline, ab 558
Kindergarten diet, ab 636
Kitchen (*see also* equipment), cafeteria, industrial, ab 562
planning, *86
remodeling an old, problems of, *89
utensils, necessary, ab 56
K rations, *216
for babies, f 636

L

Labeling, nn 714
waterproof, ab 116
Labor (*see also* employee, personnel), forecast in food industries, f 592
part-time, ab 116
turnover, ab 182
utilization, ab 268
Lactation, diet in, ab 108
Lactose utilization, ab 48
Lard (*see* fat)
Latin America, notes from, nn 418, 716
Lecithin, ab 52
Legislation (*see also* school), nn 340, ab 412, nn 710
Leguminous sources of protein, biological value, *81
Lend-lease food program, f 17, cc *316, nn 490, 646
Lighting, modern, ab 484
Liver, and biliary tract, infections, ab 478
disease, carbohydrate in, *365
extract, sensitivity to, ab 554
fat, effect of amino acids on, ab 630, 774
fatty, ab 256
glycogen content, ab 174
thiamin and riboflavin in, ab 630
Looking ahead in 1944, ed *18
Lunch (*see also* cafeteria, industrial, school), school, ab 56, 184, 562
school, rationing, nn 188
school, WFA aids, n *96
school, wartime problems, n *100
Lunchroom (*see also* lunch) directors, nn 716
school, administrative problems, ed *94

M

Magnesium deficiency, ab 328
Maintenance, building, ab 262
Malaria, hepatic dysfunction in, ab 260
Malnutrition (*see also* deficiency, vitamin), in Ceylon, ab 42
Malta, health in, ab 552
Management (*see* cafeteria, employee, hospital, institution, restaurant, etc.)
Mannose, metabolism of, ab 260
Manpower Commission, War, *162, nn 570
Margarine *vs.* butter, ab 50, *83, f 670, ab 706
controversy, nn 58, ab 114, 260, nn 642
mold, ab 114
Marjoram, oil of, ab 266
Marmalade, nn 492, *668
Maternity and infant care, emergency, nn 194
McCollum, E. V., receives award, nn 418, 716
Meal (*see also* lunch, menu), and morale, ab 180
planning, ab 180
service, Army and Navy, *144
Meat (*see also* beef, sheep), and blood regeneration, *747
canned and dehydrated, nutritive value, ab 628
carcass fat, studies of consumption and salvage, cc 614
vs. cereal, f 170
cookery, ab 52, 180
dehydrated, ab 112, 704, nn 712
extension, *150
frozen, ab 266, nn 712
storage, f 756
supply (*see also* food situation, national), *15
vitamin A in, ab 176
Medicine, physical, report, nn 640
postwar, f 576
socialized, ab 332
and the war, ab 556
Menu (*see also* meal), and nutrition service, f 665
and service, ab 182
Mesquite, ab 636
Metabolism (*see* carbohydrate, iron, mineral, nitrogen, etc.)
Methionine metabolism, ab 406
Methylcellulose and digestive tract, ab 558
Metric system, ed 93, ab 258
Mexican food habits, *289
Mexico City, nutritional status of population group, *289
Migraine, due to milk, ab 552
relieved by insulin, ab 476
Milk (*see also* children, dairy products, infant), acidified, ab 636
and blood regeneration, *747
bottles, cleaning, ab 44
chocolate, growth of rats on, ab 560
cooked, vitamins in, ab 634
dry, ab 54, 114
evaporated, ab 116, 558
evaporated, vitamin C retention, ab 484
fortification, ab 773
frozen, concentrated, ab 776
and honey diet, ab 328
iron in, ab 554
riboflavin content of, ab 174, *226
Mineral (*see also* specific food, or mineral, etc.), oil, ab 110, 560
supplements, ab 108
trace elements, ab 110
Moore, Maniza, President, A. D. A., ed *691
Mullet, ab 114
Mushrooms, dehydrated, ab 114
Myocarditis (*see* deficiency)

N

National food situation (*see* food)
Navy (*see also* cookbook, nutrition, etc.), dietitian in, n *26
feeding program, *140, *144, n *165, *166
needs dietitians trained in nutrition and dietetics, ed *315
Negro, diet and disease, ab 560
Netherlands, food patterns, *678
substandard diet in, nn 418
Neuropathies, ab 400
New Guinea, Army dietitian in, f *443
greetings from, f 410
News Notes, 58, 118, 186, 272, 340, 412, 488, 564, 638, 710, 777
Niacin (*see also* pellagra, vitamin B complex), deficiency anemia, ab 178
and nicotinamide, ab 178
in postoperative vomiting, ab 554
Nicotinamide, effect of feeding, ab 630
and muscular effort, ab 110
Nicotine, effect, ab 558
Nicotinic acid (*see* niacin)
Nitrogen (*see also* protein) metabolism, ab 558
Nominating Committee (*see* A. D. A.)
"No-Point—Low-Point Foods" program, nn 192
Norway, food patterns, *676
starvation and rehabilitation in, f 286
Nucleic acids, and tissue growth, f 741
Nurse, Aide, Army, nn 494
curriculum, accelerated, teaching nutrition and dietetics, n *458
student, teaching nutrition to, *229, n *462, n *464, cc *542, cc *544
Nursery, day, ab 486
Nutrition (*see also* children, diet, dietary, education, industrial, pregnancy, and specific country or race, etc.), child, Mexico, Egypt, Belgium, India, n 616
conference, nn 640
courses, Harvard, nn 710
demonstration, ab 478
and disease, ab 254
education, f 429, ab 560, 708, 774
fats in, *83
fellowship, nn 566, 710, f 762
food and, international cooperation, *530
Foundation, Inc., nn 58, ed *609
handbook of, ab 258
and heat loss, f 80
in a London hospital, ab 42
New York City Division of, nn 58
News Letter limits circulation, nn 572
postgraduate work in, nn 566
in pregnancy: a review, *735

Nutrition, in preventive medicine, ab 46
program, college, *590
program, Iowa State Health Department, n *454
program, material, nn 60, 120, 192, 272, 342, 414, 492, 570, 640, 716
program, in a metropolitan area, n *448
program, New York State, nn 122
in Puerto Rico, *298, *305
recent progress in, ab 176
recent trends in the science of, cc *378
of rural populations, ab 40
scholarship, f 368, nn 777
as a science, ab 628
in supportive treatment, ab 258
and surgery, ab 328
survey, *289, ab 402, *524, *528, *671
survey, by chemical analysis, ab 704, *742
survey, Navy, f 532, nn 716, 779
teaching (*see also* education, nurse), in accelerated nursing curriculum, n *458
teaching, student nurses, *229, n *462
teaching, in wartime, *155
under-, adaptation to, *511
under rationing, in England, *4
of urban low-income groups, *605
Nutrition and the War, 19, 96, 164, 250, 382, 448, 544, 616, 767
Nutritional (*see also* nutritive), deficiencies, ab 404
quality of dietaries, by chemical analysis, *742
status, ab 48
status, of a population group in Mexico City, *289
Nutritionist, learning to be, in industry, n *386
place of, f 88
Nutritive value, of fruits and vegetables, as affected by preparation (*see also* specific food or group of foods), ab 44
Nuts (*see also* peanut), cooking, nn 712

O

Obesity, in childhood, dietary treatment, *361
energy metabolism in, ab 482
etiological aspects, ab 482
experimental, ab 552
Office of Price Administration (*see also* rationing), f 157
Oil (*see also* fat, shortening), cooking, ab 116
Orange (*see also* fruit juices), marmalade, ascorbic acid content, *668
Organic unity, f 741
Ovens, mechanical, ab 112

P

Packaging, food (*see also* storage), ab 116, 266, 484, nn 492
Palatability tests, ab 484
Pan-American, production survey, nn 646
Pancreatic enzymes, adaptation to diet, ab 400
Pantothenate (*see* work)
Pantothenic acid deficiency, ab 110
Papain and meat, ab 330
Paper conservation and salvage, nn 272, 340, 414, ab 562
Pasteurization, effect, on riboflavin content of milk, *226
Payroll calculator, ab 116
Peace, Commission to Study Organization of, nn 280
Peanut meal as source of protein, *81
Peas, frozen, thiamin content, ab 44
source of protein, *81
Pectin, ab 410
Pectinates, in frozen fish, ab 266
Pediatric viewpoint, in war-torn areas, ab 254
Pellagra, manifestations, ab 708
Pemmican, f 604
Penicillin, distribution, nn 494
surgical infections, ab 110
therapy, and diet, f 80
Peptic (*see* ulcer)
Pepys, Samuel, dining with, *434
Personnel (*see also* employee, labor), management, in hospitals, *137
management, in an industrial cafeteria, n *164
Phagocytic functions, ab 404
Philippines, internment camp food, f 270
Phospholipids, ab 630
Phosphorus, intake, college women, *671
metabolism, tocopherols in, ab 178
Physical fitness, high school students, ab 558
special year on, nn 566
Pickle supply, ab 114
Pineapple, dehydrated, ab 776
Plant varieties, new, nn 278
Poisoning (*see also* allergy, food), cadmium, ab 40
lactic acid, ab 630
tyrosine, ab 554
Poland, food patterns, *687
Poliomyelitis, dietary deficiency and, ab 402
etiology, ab 706
management, nn 58
riboflavin, pantothenic acid, and biotin excretion in, ab 406
Postwar policy-making, ed *446
Potatoes, nn 276
ascorbic acid content, *220
dehydrated, baked, ab 54
sweet, ascorbic acid in, ab 330
sweet, products, ab 776
Poultry, nn 194, 278, 568, ab 775
Pregnancy, effect of, in rheumatic patients, ab 254
nutrition in, ab 112, *735
vitamin C levels in, ab 478
President's address, *663
Price, control (*see* rationing)
trends, ab 176
Professional Education Section, A. D. A., project 3, nn 564
Protein (*see also* amino acid, nitrogen), biological value, f 76
from corn germ, ab 50, 334
dynamic effect, ab 560
food, ab 174
food, consumption, United States, f 85
from grass, ab 50
high-, diets, *666
hydrolysates, f 667
intake, *671
leguminous sources of, *81
metabolism, ab 176
metabolism, and acquired immunity, *77
tissue, and liver toxicants, ab 558
vegetable, *81, ab 114
Prothrombin, ab 556
Psychosomatic medicine, ab 708, f 741, ab 773
Public health (*see* health)
Puerto Rico, nutrition in, ab 258, *298, *305
Pyridoxine, deficiency, ab 180, 260, 480
determination and stability, ab 774

Q

Quick-freezing (*see also* specific food), as applied in the hospital dietary department, cc *236
methods, ab 54, 336, 408, nn 492, 570

R

Radio, for mothers, ab 40
Rancidity, retardation, ab 178
Rat control, ab 178, nn 644
Ration (*see also* Army), emergency, ab 54, 556
Rationing (*see also* food, Office of Price Administration), ab 46, 54, nn 58, 118, *144, nn 188, 272, 344, 416, ab 562
accounting, *593
in England, *4, f 8
and food costs, ab 54
in France, ab 634
and the physician, nn 196
point control, ab 338, *593
and price regulations, nn 488, 568, 640, 714, 778
Red Cross, food parcels, ab 330
war fund, nn 186
Refrigerants, ab 262
Refrigeration (*see* food)
Refrigerators (*see* equipment)
Refshauge, Lucille, ed *231
Reindeer, ab 708
Relief, problem of, in liberated countries, *676, *763
Renal function and vitamin A, ab 108
Reproduction, diet in, ab 108
Research, grants, nn 640
medical, in food and nutrition, ab 44
Restaurant (*see also* cafeteria), Association, National, nn 420, 570
British, ab 336
management, nn 196
seating dimensions, ab 116
Rheumatic fever, ab 404, 628, 708
Riboflavin, biosynthesis, ab 773
in blood regeneration, ab 48
content, milk, ab 174, *226, ab 704
deficiency, manifestations, ab 42, 704, 773
deficiency, treatment, ab 50, 702
retention, vegetables, canned, *369, *752, *757
Rice, diet, ab 560
processed, unmilled, ab 54
Rickets (*see* vitamin D)
Roach control, ab 410
Rolls, production, ab 112, 180
Romania, food patterns, *683
Royal Canadian Air Force (*see* dietitian)
Russia, public health in, f 599

S

Safety (*see also* accidents), ab 562, nn 644
Salmonella enteritidis, ab 330
Salt, removing, from sea water, ab 112, 406
-free diet, for hydrarthrosis, ab 40
Sanitation (*see also* cleaning, detergents, dishwashing), food standards and, *144
Scandinavian food habits, ed 234, *676
Scholarship fund, nn 777
School (*see also* lunch, lunchroom) lunch, nn 566
lunch, course, nn 494
lunch, legislation, f 252, ab 486, nn 638
lunch, pamphlets, ab 486
lunch, recipes, nn 192
lunch, in South America, f 304
lunch, workshop, Florida State College for Women, nn 412
lunchroom manager, ab 486
secondary, health education, nn 638
students, high school, physical fitness, ab 558
Scurvy (*see also* ascorbic acid, vitamin C), ab 702
plasma fibrinogen in, ab 334
Seasickness, ab 180
Serologic tests, ab 178
Sheep, new breed for small roasts, nn 414
Sherbets, ab 56, 182, 268
Shock, metabolic aspects, treatment, ab 402, 702
Shortening (*see also* fat, oil), ab 266
vegetable, f 670
Silverware, care of, ab 56
Smallpox vaccination, ab 46
Smedley, Emma, ed *93
Social security, nn 710
Soup, dehydrated, ab 114, 338, 410
packaging, ab 114
self-heating, ab 484
stock, ab 54
South America (*see also* Argentine, Brazil, etc.), child nutrition, *308
food production, nn 278
school lunches, f 304
Soy products, ab 54, 182, 264, 266, f 307, ab 408, 562, 776
Soybeans, as sources of protein, *81
Spa regimen, and diet, ab 46
Spinach, vitamin retention in, *757
Sprue, treatment, carbohydrate in, *365
Standards (*see* labeling, grades)

State institution, food production program, cc *240
Storage (*see also* packaging), nn 644, 712
Strawberries, ab 414
Streptococcus outbreak, ab 40
Student (*see* college, dietitian, nurse)
Sugar, ab 264
in cooking fruit, f 597
as diluting agent, ab 558
Research Foundation, ab 346
Sulfa drugs, fever, ab 400
effect on vitamin K, ab 774
Supervisors, rating, ab 270
Sweat, water-soluble vitamins in, ab 482
Sweden, food in, f 286

T

Teaching (*see* dietitian, education, nurse, nutrition)
Teeth (*see also* caries, dental), of school children, *147, ab 554
Temperature, high, gastric emptying time, ab 476
Tetany, due to magnesium deficiency, ab 328
Thiamin, and ascorbic acid, interrelationship, ab 46
assays, *216
biosynthesis, ab 48
in biscuits, ab 704
and cocarboxylase, ab 178
content, of frozen peas and corn, ab 44
control, ab 336
deficiency, ab 44, 108, 480, 552, 772
deficiency, oral lesion in, ab 50
determinations, ab 176, *742
and hyperthyroidism, ab 112
metabolism, ab 400
-producing bacteria, ab 112
requirement, of man, critique of values suggested, *516
retention, in quick-frozen broccoli, *369
retention, vegetables, canned, *369, *752, *757
in synthesis, fatty acids, ab 558
or thiamine? ed *609
thiochrome test for, ab 108
Thirst, glucose in, ab 560
Thyroid disease in children, ab 628
Tocopherols, ab 334
Tomatoes, canned, vitamin retention in preparation, *752
when to pick, nn 492
Training courses (*see* A. D. A., college, dietitian, Eastman)
Tryptophane, metabolism, ab 774
Tuberculosis, ab 332, 480
Tuna, liver oil, ab 334
Turkey, nn 778
Turnip greens, ab 330
Typhoid, outbreak, ab 40
synthetic diet in, ab 478
Tyrosine poisoning, ab 554

U

Ulcer, peptic, ab 332, 560, 630
Undernutrition, adaptation to, *511
United States Department of Agriculture, releases (*see* food situation, national)
Urinary ammonia, ab 258

V

Vassar, housekeeping, 1865, ed *446
Vegetables (*see also* dehydrated), ascorbic acid losses in mincing, ab 560
brined and fermented, ab 628
canned, nutritive value, ab 628
dehydrated, ascorbic acid content, *216
dehydrated, palatability, ab 44, 184
dehydrated, vitamin losses during storage, ab 40
nutritive value, as affected by preparation, ab 44
salting, ab 484
shortening, f 670
vitamin retention in (*see also* specific vegetable or vitamin), ab 44, *369, ab 560, *752, *757
Victory gardener's handbook on insects and diseases, nn 494
Vitamin (*see also* blanching, deficiency, dehydration, and specific condition, food, or vitamin), and color, ab 408
content of foods, f 297
deficiency, ab 254
in dermatology, ab 408
and eyestrain, ab 176
Foundation, National, nn 640
in medical treatment, dosage, f 756
microbiologic analysis of, ab 258
mixtures, ab 402, 706
new, ab 708
past, present, and future, cc *95
and physiological function, ab 42
retention, vegetables, *see also* specific vegetable, as affected by preparation, ab 44, *369, ab 560, *752, *757
supplements, ab 108, 254
synthesis, intestine, ab 708
tablets, nn 572
water-soluble, ab 50
water-soluble, in hair, ab 774
water-soluble, in sweat, ab 482
Vitamin A (*see also* carotenemia, hypervitaminosis A), and blood pressure, ab 108
and carotene, in plasma of rheumatic subjects, ab 560
concentrations, ab 42
deficit, nn 494
in meat, ab 176
nutrition, of rural population, ab 476
plasma level, ab 176, 476
and renal function, ab 108
Vitamin B complex (*see also* B vitamins), avocado, *688
award, nn 418
deficiency, ab 108
and promin, ab 560
supplementation, in industry, ab 706
Vitamin B_1 (*see* thiamin)
Vitamin B_2 (*see* riboflavin)
Vitamin B_4, and amino acids, ab 48
Vitamin B_6 (*see also* pyridoxine), and hematopoiesis, ab 334
Vitamin C (*see also* ascorbic acid), ab 44
deficiency, ab 334
nutrition, in a hospital, ab 406
in peripheral vascular failure, ab 482
physiological significance, in man, ab 632
sources, ab 50, 775
Vitamin D, effects, massive doses, ab 40, 334
Vitamin D_2, and blood pressure, ab 108
Vitamin E (*see also* alpha-tocopherol), ab 334
deficiency, the heart in, ab 476
and reproduction, ab 108
Vitamin H (*see* biotin)
Vitamin K (*see also* sulfa), and aspirin, ab 332
avocado, *761
blood fortified with, transfusions, ab 328
Vitamin M, xanthopterin, and folic acid, ab 260
Volunteer workers (*see also* dietitian aide), male, in hospitals, f 311
Vomiting, postoperative, nicotinic acid and, ab 554

W

Wage and salary stabilization, ab 260
Waitress (*see also* employee), training of, ab 268
War (*see also* Army, nutrition), and the A. D. A.: A review, *1
and our meat supply, *15
War Food Administration, n *96, nn 190
Wards, use of, in teaching program for student nurses, *464
Wartime, conference, national, nn 412
school lunch problems, n *100
Waste (*see also* conservation, food), in the Army, *357
kitchen, ab 116
Wellesley School of Techniques, nn 420
Wheat (*see also* bread, cereals), whole, flour, which does not become rancid, c *380
Wheeler, Ruth, honored, ed *766
Woman, career, warning to, f 589
in postwar policy making, ed *446
in war industries, ab 270
Women's Army Corps, dietitian in, n *30
Work, manual, employees, ab 628
output, and B vitamins, ab 772
output, effect of environment and internal factors, ab 628, 772
output, and pantothenate, ab 772
simplification, ab 262

Y

Yeast, as a food, ab 54, 114, 484
Yugoslavia, food patterns, *684
traditional ways of living in, *373

Z

Zinc, absorption and elimination, ab 110

AUTHOR INDEX

A

Adolph, W. H., 520
Albus, W. R., 760
Allbritton, M., 769

B

Babkin, B. P., 626
Bacon, K., 688, 761
Barber, M. I., 357
Barrentine, M. W., 521
Batjer, M. Q., 771
Baughman, H., 464
Beard, J., 474
Behm, D. F., 100
Black, J. D., 38
Block, R. J., 69, 150
Bolling, D., 69
Boudreau, F. G., 530
Bowes, A. deP., 155
Boyd, J. D., 147
Bradley, A., 106
Bradstreet, R. B., 550
Brobeck, F., 626
Brown, M. K., 26
Bruch, H., 361
Brush, M. K., 752
Burke, B. S., 735
Burt, D. F., 668

C

Calvo, J. (de la Torre), 289
Cannon, P. R., 77
Carden, G., 474
Carson, M. E., 443
Case, E., 398
Clarke, E., 106
Clausen, N., 663
Cochlan, C. C., 172
Corban, E. B., 104
Cox, E. L., 30
Cutlar, K. L., 757

D

Dent, A., 326
Dodge, Q. O., 390
Dorland, W. A. N., 472
Drake, P., 528
Dunstan, E. M., 441
Dwight, J. C., 448

E

Elvehjem, C. A., 216
Emerson, P. H., 767
Everson, G., 81

F

Fagan, P. T., 162
Fenno, A. M., 144
Fenton, F., 369, 757
Fernald, M. L., 38
Field, A. M., 380
Fishbein, M., 95
Floore, F. B., 540
Flynn, M. A., 434
Francis, C. A., 172

G

Gatten, E. L., 164
Gatto, F. M., 384
Ginn, A., 104
Gortner, R. A., 160
Goure, H., 544
Graubard, M., 104
Greenwood, M. L., 524, 671
Gunderson, F. L., 160

H

Haagensen, C. D., 396
Hains, A., 596
Hall, G. E., 587
Halliday, E. G., 220, 752
Hallock, E. R., 104
Hardenbergh, W., 15
Harding, T. S., 544
Harrington, M. M., 466
Harris, J. W., 9
Harris, K. W., 369, 757
Harris, R. S., 742
Hawley, E. E., 474
Heckert, A., 81
Hemphill, F., 605
Hendrickson, R. F., 763
Heseltine, M. M., 308
Hilliard, J., 172
Hinderer, E., 688
Hines, H. W., 150
Hinman, W. F., 752
Hollen, E., 454
Holmes, A. D., 226
Horstmann, D., 542
Howard, B. C., 626
Howe, P. E., 444
Hult, M., 12
Hunscher, H. A., 229, 316

I

Isker, R. A., 722

J

Jacobs, M. B., 550
Jeffs, K., 19
Joffe, N. F., 676
Johnson, D., 666
Johnson, K. M., 163
Johnson, M. L., 668
Jones, J. B., 369, 757

K

Kahn, R. M., 220
Kain, I. J., 550
Kalsem, M. E., 722
Kilander, H. F., 382
Kinsey, A. C., 38
Kramer, M. M., 213
Krause, M. V., 610

L

Lamb, M. W., 528
Lassen, S., 688, 761
Leverton, R. M., 747
Lindman, I. S., 720
Lloyd, W. E. B., 396
Lockhart, E. E., 742
Lockhart, H. S., 742
Longenecker, H. E., 83
Lonsinger, B. N., 524, 671
Lord, E. G., 80
Lorentz, M., 458
Lorenz, A. J., 430
Louser, K. E., 240
Lutz, F. H., 445

M

McAuley, M. F., 140
McCarthy, J., 326
McCurdy, F., 498
MacKinnon, F., 1
McLean, B. B., 762
MacLeod, G., 472
McMillan, T. J., 747
Macy, I. G., 602
Martin, M., 104
Melgaard, J. M., 89, 472
Melnick, D., 150, 516
Mitchell, H. H., 511
Mitchell, H. S., 676
Moreland, R. F., 34
Morris, M. M., 96
Morse, E. C., 172
Munsell, H. E., 305
Murray, M. G., 3

N

Nagel, A. H., 742
Nelson, H. E., 250
Nelson, P. M., 398
Nutter, M. K., 742

O

Oser, B. L., 150

P

Paarlberg, D., 396
Pavcek, P. L., 216
Payne, G. C., 289
Pearson, F. A., 396
Peters, F., 242
Peters, M., 747
Phillips, M. G., 369
Portis, S. A., 771
Price, M. S., 322

R

Radell, N. H., 593
Radin, G., 373
Rae, B., 106
Rehder, T. M., 166
Ricketts, H. T., 365
Robbins, A. R., 38
Roberts, L. J., 298
Robins, E. P., 386
Robinson, W. D., 289
Ross, M., 598
Rowe, A. H., 474

S

Santa Maria, J. V., 312
Scoular, F. I., 223, 668
Selling, L. S., 622
Sevringhaus, E. L., 612
Sexton, S. J., 424
Sheets, O., 521
Skupski, E. L., 486
Smedley, D., 104
Spence, B., 316
Stern, F., 326, 427
Stewart, E., 236
Stewart, H. M., 228
Streidl, M. A., 22
Sutherland, E., 398
Sutherland, J., 761
Sweatman, M. D., 172
Sydenstricker, V. P., 4

T

Tanner, F. W., 626
Tapia, E. W., 742
Taylor, C. M., 472
Taylor, M. L. R., 172
Thomson, D. L., 378
Tiffany, V., 742
Todhunter, E. N., 771
Tuft, E., 86
Turner, C. E., 106
Tuttle, W. W., 172

W

Wallace, L. H., 474
Warner, C. B., 18
Waterman, T. L., 550
Wells, L. C., 168
Whipple, D. V., 326
Whitmer, M., 462
Wickard, C. H., 527
Wilinsky, C. F., 137
Willard, H., 223
Williams-Heller, A., 326
Wilmot, J. S., 771
Winters, J. C., 605
Wood, M. A., 369
Woodson, L. W., 600
Wyman, M., 398

Y

Young, C. M., 590

Z

Zipple, H., 165
Zoethout, W. D., 172

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